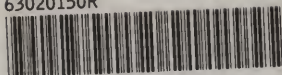


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# REPORT

OF THE

New Jersey.

# HEALTH COMMISSION

OF THE

STATE OF NEW JERSEY,

*FOR THE YEAR 1874.*

TRENTON, N. J.:

PUBLIC OPINION—W. S. SHARP, BOOK & JOB PRINTER, 86 & 88 WARREN ST.

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## REPORT.

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The commission appointed by the last Legislature under Senate bill 156, entitled "An act relating to Public Health," beg leave to make the following report to his Excellency the Governor of New Jersey :

The design of the commission, as set forth in the act, is to examine into the sanitary needs of the State, into any defects in existing laws bearing upon the preventure or mitigation of disease, and in general to inquire what ought to be done by the State in conserving the physical welfare of the citizen.

It will need but little argument on our part to show that the public health is a great and material public interest.

The physical condition of a people is one of the most important inquiries to which the true statesman can turn his attention. History furnishes us abundant evidence, that whenever a race deteriorates physically, it also deteriorates morally, socially and politically.

The welfare of the State is involved in the physical welfare of the citizen to a degree that should arrest the attention of every legislator.

Good health and powers of physical endurance give a basis for prosperity that no nation can do without, while impaired vitality arising from any cause, is sure to make itself felt as a limitation upon the power and progress of a people. "It is the first duty of a State to attend," says D'Israeli, "to the frame and health of the subject." We have, so far back as the Cyropoedia of Xenophen, the statement that "Physicians who only treat the sick are like the menders of old clothes, while the preservation of health is a noble work worthy of Cyrus himself."

The fate of a nation will ultimately depend upon the health and strength of the population. The recognition of this fact is at the foundation of much of the athletic training of the ancients.

The care for a robust, well developed population which seemed to be the ruling passion of the father of Frederick the Great, and which led him to practice austerities in order to set example to his nation, was followed by his successors, and has much to do with the present power and prowess of the German empire.

Similar spirit and similar habits characterized our English ancestry and gave vigor and character to the first settlers of America. Great facts as to our population, which social science is constantly bringing to view, show most plainly the need we have to make study of this whole subject.

So profoundly was Gen. V. H. Walker, the Superintendent of the last Census of the United States, impressed with this view, that he entered upon a statistical examination of the bodily condition of the inhabitants of the country. Congress, even in its days of retrenchment, so far recognized its importance as that not only appropriation was made for a "Statistical Atlas," but at the last session additional appropriation was made for the adding of such explanatory facts as shall exhibit social and other characteristics, and the laws as to the frequency and locality of our most common diseases.

The field is so extended that it is only by the co-operation of local authorities that accurate results can be secured, or at least by the awakening of each State to some appreciation of the practicability and necessity of such inquiries.

The great design of government is to secure the prosperity of its subjects. Their condition as to health is so indispensable to this end that it can in no wise be thrust aside as a secondary consideration. It has vital and intrinsic and fundamental bearing. Where disease is rampant there is an element of unhappiness, which, like a millstone, tends to bring down the welfare of the people. There is a loss of power as well for the State as for the individual or the family.

Nor has it less bearing upon the question of pecuniary benefit or national resources. The heaviest tax upon a people is that which it pays to disease.

The census of the comparatively healthy city of Dublin was taken in one night, and the result and the tables of Playfair, Finlaison and others, show that on an average each death represents not less than twenty-five other cases of sickness, and each sickness not less than twenty-five days of suspended labor. Add to this the care needed for the sick, and it is not easy to calculate what this means as a deduction from the productive power of a State. Millions of dollars do not express it. The aphorism of Franklin is correct: "Public health is public wealth." The money value of life and health to a community is real. Engineer Latham is right when he says, "Health is the capital of the laboring man." We trust the time will soon come when philanthropists will no longer complain "that politics, in the usual narrow sense of that word, is more attractive to orators and more exciting to constituencies than the health and well being of the people, which the law-givers of ancient empires made their chiefest care." "Nothing," says Parkes, "is so costly in all ways as disease, and nothing is so remunerative as the outlay, which augments health, and in so doing augments the amount and value of the work done."



"Drainage and the laying of impervious foundations," says Mapother, "are expensive works, but the waste of life and health by cholera, fevers, rheumatism and other zymotic diseases, and by general depression of healthy vigor which they will prevent, will afford ample repayment." Says Dr. Jarvis, of Dorechester, "the first and largest interest of the State lies in this great agency of human power, the health of the people." We wonder not that the first bill for a State Health Board in Massachusetts was passed under the auspices of the party of retrenchment, because its leader demonstrated the economy of legislative care for health. Professor Chandler, at a recent meeting of the Social Science Association in New York, showed that the cost of the health law, as related to tenement houses, was but seven dollars per house, and the amount of ill health prevented by visitation of them far more than paid all expenses.

Lawyer Eaton says that "guarding the people from the sources of disease, contagion and death, is one of the most profitable and solemn of all the subjects of human legislation."

Much of the effective force of a State depends not so much upon the aggregate number of its population as upon the ratio which the productive bears to its consuming forces. We need to look for its sustaining class, and then to compare it with those who by disease or injury, or from other causes, are a tax upon the resources. A table compiled from a census of the chief countries of Europe and of our country, between 1860 and 1870, shows that in the United States there are less in the sustaining class and more in the dependent class than in any of these, save Ireland.

Lord Stanley has well said: "Dry and unattractive as sanitary studies may appear, they belong to the patriot no less than to the philanthropist; they touch very nearly the future prosperity and national greatness."

They have to do with great social changes and forces, which have immense bearing on the welfare of the State.

The most of disability arises from imperfect health, which soon converts power into dependency and deprives us of the ability to co-operate with others in the creation of capital. Dr. Jarvis, in the health reports of Massachusetts, calculates a loss in time, in 1870, of twenty-four thousand five hundred and fifty-three years and eight months for that year in that state, from sickness, not including ailments of less than a week duration, or cases of chronic impaired power, arising from various causes.

Multitudes of facts similar to these might be adduced to impress how much the welfare of the State depends upon the health of the citizens. It is so much a question of fundamental, vital and national interests, and so plainly exhibits itself as such, that all legislative questions as to it, must turn on feasibility of methods and possibilities of relief, rather than upon any question as to its desirableness. If

the legislature could banish all disease by an edict, it is probable that no one would question the right or propriety of such legislation, even though it involved some expense.

As they cannot do this, in so far as legislation can prevent, limit, abate or modify disease, the subject becomes a legitimate one for your examination and consideration.

Few, even in ancient times, denied the theory that health is a matter of State concern; but there were two great difficulties in the way of legislation in respect to it. The causes and conditions of disease were so little known, that only limited methods were at hand to check its ravages, and the people had little conception of the relation existing between certain operative causes and sickness, as a direct result thereof.

Superstition taught disease to be a visitation of evil spirits, and medication was little more than a system of notions and charms. As in other experimental sciences, there had not yet accrued that accumulation of well observed and accurately classified facts, which make experience and which enable us closely to associate cause and effect.

Although it could be seen that good health was one of the most important interests of a nation, and that legislation was advisable, there was so much absence of knowledge, that effective methods could be devised only within narrow limits.

It is profitable to notice the outreachings of law in its attempts to look after these interests. The superstitious element being most prominent at first, the temple of Hygiea and the propitiation of divinities, was the chief manifestation of effort. Afterwards, the immense sewerage of Rome, its public baths and the provision made for extended drainage, show at least, some recognition of the necessity of abating nuisances and promoting the conditions of health. In England, so early as 1765, Sir William Blackstone enumerates among the fourth species of offences, more especially affecting the commonwealth, such as are against the public health of the nation, "a concern of the highest importance, and for the preservation of which, there are in many countries, special magistrates or curates appointed." There was the constant desire and attempt on the part of law-makers, to care for the public health; but it was necessarily confined to provisions for limiting the spread of disease, when epidemic, rather than to any idea of its prevention. The man with the plague-spot was shunned as dangerous to society, and the victim of small pox, too often consigned to isolation and death.

But, with the advance in all physical science following the application of the inductive method of Bacon, a new era dawned upon that department of these sciences which relates to man.

Physicians reasoned from effects to causes, and also with a closeness of examination and accumulation and classification of facts, plainly showed to statesmen and philanthropists, that the time was coming

when those who had governmental care of the public weal, would have to consider how to protect society from the causes which deteriorate health and accomplish death. Especially within the last thirty years, public attention on the continent and in England and in our own country, has been directed to the relation which legislation bears to such matters.

English capital and revenue was largely concerned in mining interests, and the evils which undermined the health of the laborers could not but attract attention. Operatives, too, in various kinds of factories, were found to suffer from influences deteriorating and undermining health. The foul condition of jails and other public institutions, and their influence as centers of contagion, also aroused the consideration of philanthropists.

More than all, the possibilities of protection from the all prevalent small pox, brought prominently to notice the possibilities of preventive legislation.

Parliament from time to time appointed sanitary commissions, which, by their careful inquiries into the causes and conditions of disease, their array of facts and the testimony of experts, convinced many of the need of governmental action.

About 1838, reform took a more definite direction, and such reports as those of the poor law commissioners on the diseases of London; that in 1840, in relation to sewers, interments, lodging houses and public baths; and that in 1843, as to the general causes of diseases in the kingdom, did much to create a popular sentiment calling for legislation.

As a result, the ministry of Sir Robert Peel made its ministrations notable by a series of acts known as "Model Acts," and in 1848, a general health law gave more extended authority in the use of the limited means at hand for preventing or limiting disease.

"So well did these laws vindicate themselves that acts passed in 1858, 1860 and 1863, extended and enlarged these beyond anything now existing in our country. Sanitary legislation was even made a part of the concern of the ministerial cabinet, and so far did the act of 1866 extend, that 'as Eaton expresses it, "it approached very near to making health legislation a distinct department of English administration."

Since then it may be said, that every year has witnessed progress in this kind of legislation, as is shown by the amended sanitary act of 1868, the Scottish Public Health Act of 1867, the act for Artisans and Laborers, of 1868, the Sewage Utilization Act of 1867, etc.

The great Health Act of 1872, makes sanitary legislation general, and recognizes that in order to be effective, it must reach the country with its marshes and decaying vegetation, as well as the crowded city, where the evils of nuisance are a little more obtrusive and declarative. D'Israeli, the present Premier, has always taken the liveliest interest

in sanitary reform, and has commended himself to the masses by the advocacy of their interest in these regards. "The Foods Commission, and the Public Health Act," owed much to his earnest support.

In Germany and in France, the progress of sanitary legislation has not been less marked, popular and successful.

In the United States there has also been recognition of protection against disease as a subject for legislation, and hence, systems of quarantine were early established. Measures were taken to prevent the spread of epidemics, such as notifying the people to avoid an infected district, or sending them a distance into the country. But it has chiefly been within the last fifteen years that the subject has attracted attention as requiring something more than these old accustomed provisions.

Such definite advance has been made in our knowledge, either of the causes or the sustaining and intensifying conditions of disease, that it has been found practicable to seek to prevent its occurrence as well as to limit its extent and abate its virulence after it has invaded.

Where systematized efforts have been put in operation, the results have been so demonstrative as to prove, beyond controversy, our power to modify disease so as to diminish the rate of its occurrence, to restrict its fatality and even so to arm ourselves as successfully to repel its attempted incursion. The Council of Hygiene of the Citizens Association of New York in 1866, said: "The chief causes of disease are within the range and the duty of human control." The years that have elapsed, have still more fully illustrated the assertion. As the fact becomes apparent and established, it is easy to see that wise legislation as well as spontaneous philanthropy, will demand that lawmakers shall so fully study the subject and legislate upon it, as to conserve the health and the preservation of the people whom they represent. It is no interference with true liberty, in many cases, to prevent a person from carrying about disease. Indeed, the liberty which good government needs as distinct from license, is among other things the protection of the citizens from those evils which others, in the exercise of undue liberty, might entail upon him. If it is shown, for instance, that vaccination is a safe and available protection against small pox, and that without it the unprotected risk not only their own lives, but the lives of others, and that it can, without undue pressure, be placed within the reach of all, surely it becomes a wise government, either by diffusion of information, by cheap and ready provision of methods, or by just and unoffensive law, to secure this boon to society at large.

If cholera, in its history and habits becomes known, as would a migratory bird, and we can beforehand destroy the very food upon which its dire vitality depends, surely it is wise, that in advance, we deprive it of its nutriment. It would be grander indeed by some arrow of science, to bring down the evil raven while on the wing, but



if we cannot yet find this instrument of destruction, the next greatest and wisest thing is to remove the conditions of its existence when it shall attempt to alight.

If it is time that we are in possession of means for preventing or limiting a large proportion of the maladies which fall upon society, surely government should sedulously address itself to the deliverance of the people from this greatest of all hindrances both to comfort and prosperity.

Nor is it to be felt that the only province of sanitary law is mandatory or compulsory. Much of the province of law is regulative and instructive. The very enactment of health law, often carries with it the means of giving definite information to the masses as to what their real interests demand. It prevents the occurrence of the act, or serves by judicious enforcement, to educate public opinion, and is therefore advisory and instructive to a degree that gives it but little of a compulsory aspect. It is often, too, a system of regulated permits as well as of penalties. Hence it has, over and over again, happened to Boards of Health, to find their first opposers converted into staunch supporters, and the executioners of law have come to be welcomed as those weakening for them the shackles of disease and mitigating the thrall of that sad incarceration, which poverty and want and ignorance often inflict.

We think that without further question or illustration, it will be conceded that sanitary legislation has an important relation to a State and is due to its citizens, if it can be shown that many of the ill-health evils which afflict society, can be reasonably corrected by sanitary enactments, and that a sufficient number of trials have proven the feasibility of such efforts.

If, from the testimony of those who, as observers and students of the causes and conditions of disease, we find their opinion to be that we can, to a great degree, limit or prevent disease by the help of legislation, this will be recognized as some evidence that it should be done.

If, by considering the most prominent diseases and the great sources of ill health which afflict society, we can show that they are recognized by those who have to deal with them, as having their origin or their sustaining food in local and artificial conditions, which are abatable and preventable by help of instructive and regulative law, there is additional reason why the statesman should study the subject with interested diligence.

If, still further, we can gather up the results that legislation has already accomplished, and by facts and figures exhibit such saving and prolongation of human life and such elevation of health standard as has greatly contributed to the welfare, the happiness and productive power of the citizen, we add by still more definite experience to our proof.

If we can prove these things, we demonstrate that they should be done, that legislation should be had, and then it only remains to discuss the practicable methods.

Let us, then, first select from the mass of testimony that could be adduced, a few opinions from those who have been careful investigators of this subject.

In 1866, the Citizens' Association of New York, embracing many of its most prominent merchants and capitalists, made thorough investigation of the sanitary condition of the city, and they say: "The daily records of the medical gentlemen who have carried on the work of sanitary inspection in this city, are full of testimony to the fact that the prevalence of fever, small pox, infantile diarrhœa and pulmonary diseases, together with excessive sickness and death rate, is invariably found associated with certain well defined and local conditions, which are unquestionably the causes of such extraordinary sickness and mortality."

Again: "The sanitary wants of the laboring classes of this great city must ere long become, if it has not already, the most vitally important of all the great social questions and moral necessities that demand the attention of municipal and State authorities."

Says Simon, the most distinguished of all European sanitarians: "The preventive power which we possess over disease, is among the happiest possessions of science."

Dr. Ramsey, in his address before the Social Science Congress, says: "The physical surroundings of man, mainly determine his degree of health, vigor and longevity."

Says the President of the District of Columbia Health Board, (1873:) "The truth is becoming patent to intelligent legislation, that labor and capital, the great supports of the State, are disastrously affected, both in peace and war, by the prevalence of disease, which proper regulations are capable either of preventing altogether or materially modifying, both in type and severity."

Florence Nightingale, in her "Notes on Hospitals," says: "There can be no stronger condemnation of any town than the outbreak of fatal epidemics in it."

That keen observer, Dr. Benj. Rush, even in his day, after so large an experience said: "The means of preventing pestilential fevers, is as much under the power of human reason and industry as the means of preventing the evils of lightning or common fire. I am so satisfied of the truth of this opinion, that I look for the time when our courts of law shall punish cities and villages for permitting any of the sources of bilious and malignant fevers to exist within their jurisdiction. In the middle ages, when pestilence seized upon a town, the citizens put to death the physicians. Now-a-days, have they not sometimes need to put first on trial the legislators?"

Parkes, the distinguished English Army Surgeon and Professor of

Hygiene, says: "There can be no doubt that the great result of halving the yearly loss of the army by disease, has been the work of Lord Herbert and the Royal Sanitary Commission."

Says the Massachusetts report for 1872: "The time has come when we are not to limit preventive medicine to the abatement of nuisances which have simply become intolerable. Our commercial, as well as our physical and moral interests, require us to take a broader view of the subject; to prevent the formation of the causes of disease and public discomfort; to establish a system for the removal of all material of whatever kind, liable to suffer decay; to establish plans of drainage adequate for our whole territory, and harmonious in all their parts, and to prevent the occupation of lands, (for residence,) whose complete drainage is not already provided for; to seize and confiscate provisions offered for sale, which may be unfit for food; to see to it that the occupants of our tenement houses are helped in those essentials to health, in which they are powerless to help themselves; to open our blind alleys and narrow courts, and thus break up our nurseries of infantile cholera and intestinal disorder, and thus in every way, ensure the interests of the people.

"We are not to wait for the occurrence of some fearful epidemic to startle and frighten us into propriety by laying its dead in our streets and within our household circle, but to use the means that will beforehand, limit its power. Nor are we to concentrate too much of our thought upon the avoidance of epidemics. It is, after all, not the cannonading, but the quieter musketry of the more insidious everyday diseases, that makes up the aggregate of death and disease, and these, even more than epidemics, are amenable to sanitary methods. Nor is it enough merely to keep our people from dying. We want to augment the life and energy of the people; to accumulate vital force; to impart that robustness and opulence of health, which makes a man vigorous to do and dare noble things, whether it be an artisan at the bench, a merchant at the counting desk, the orator in the rostrum or the statesman at his legislative post; we want healthy life as well as long life. We need such productive health as not only makes life endurable, but vigorous, so that there shall not only be absence of pain, but a pleasurable performance of function."

#### VARIOUS DISEASES AS CONTROLLED BY HYGIENE.

Besides the testimony we have thus given of those most capable from observation and experience of judging of this subject, that we may more certainly arrive at the ground for such conclusions, we may well examine a few of our most prevalent diseases, to see how far they are found to fall within the range of preventive legislation.

## SMALL POX.

As epidemics, by the suddenness of their invasion and the shock of a large death rate, most attract public attention, we may first inquire how far the chief of these are preventable and what the State can do to protect its citizens from their encroachments.

Small pox, cholera and fevers, so far as our own country is concerned, stand out in special prominence. It is a matter of history, that no case of small pox ever occurred on this continent until it was imported, and that it never arises except by contagion. It has now come to have a residence in our country, and the health reports vary from a few to hundreds of cases. Our own State relations to the highways of travel, would teach us to expect our share of every thing transmissible, not excepting conveyable diseases. The only health record of our own State for the last fifteen years, shows reports which prove its existence now and then in almost every town and village of the State, and frequently to such a degree as to be extensively epidemic. The Reporter of the State Medical Society, in reviewing all our diseases in 1872, says: "Small pox has proved itself the scourge of the year." In many other years, it is noticed as epidemic in particular counties or districts, and sometimes so in the same city, two or three times.

Isolated cases in scattered localities, often serve as the nidus for its more general propagation. As it is the most contagious of all known diseases, a large number of the unprotected are, at some period of their lives, exposed thereto, and thus not only inflict a loathsome sickness upon themselves, but upon their friends and the community. They are thus not only suspending from labor and the power of producing capital, but not unfrequently interference with local trade results. When such a city as Newark reports over two hundred cases in a single year, and Hoboken, Jersey City, Camden, Hudson and other cities have their due proportion, we do not wonder that it finds its way to our extreme counties, and even in rural districts becomes epidemic.

Alongside of this scourge we set the plain fact, that no known disease is so preventable.

The experience of the Prussian Army, the records of English Registry, the Boston law, and manifold instances which might be quoted, show that, as a prevalent disease, it can be reduced to a minimum. The protective power of vaccination is proven by evidences of facts so decided, that a recent author has given it as a proof of original sin, that now and then some one will question its efficiency. Even the old criticism of contamination from the blood of others, has been so thoroughly examined by modern science as to show that the vesicle or sore, has its own distinct character uninfluenced by the system in which it has acted, just as a graft has its own fruit, independent of



that of the tree into which it is inserted. If there are certain very rare exceptions, the minute possibility is now furthermore entirely obviated by using lymph taken directly from the calf on which it has been propagated.

The operation itself is so cheap, simple and harmless that fear and poverty have ceased to be arguments.

"Small pox, since the discovery of Jenner," says the report of the New York Council of Hygiene, "may be regarded as wholly preventable."

Says Dr. Pringle, of H. M. Bengal Army, "great success has attended the attempt to stamp out the small pox amid the teeming population of India."

Soon after the introduction of vaccination in this country (1799) Massachusetts provided for vaccination through the State. Up to 1837 there were from it but 37 deaths in Boston, and in the next twelve and a half years there were 679 deaths, representing thousands of cases, and the people saw the need of return to former legislation.

Dr. J. P. Loines, vaccine physician Eastern Dispensary, New York City, says: "As vaccine physician to large public institutions and also to quarantine, my number vaccinated during the last fifteen years has been considerably over 200,000." He speaks with confidence of its universal success.

Drs. Parkinson, McMiller and Warner, also Dispensary physicians, speak of its almost complete prophylactic power.

The New York Board of Health says: "The medical profession, and especially the more advanced students of contagious diseases, hold firmly to the faith of Jenner, that vaccination is a sure preventive of small pox when the individual is brought completely under its influence."

The International Medical Congress, held at Vienna, September, 1872, declares vaccination indispensable and advises its universal adoption. Colin, of Paris, with an experience of 8,000 cases, says to renounce this protection is "high treason against humanity."

The Epidemiological Society of Great Britain has demonstrated that in the half century from 1750 to 1800, out of every thousand deaths there were 96 from small pox; whereas from 1800 to 1850 the number of fatal cases from this disease did not exceed 35 to the thousand.

P. Lorain says that "In vaccination medicine possesses a certain means of absolute efficiency for destroying variolus miasm."

In Ireland, vaccination was made compulsory in 1863. Since that period the Irish Poor Law Commissioners have carried out the provisions of the law, and the whole population has been vaccinated. The results are seen in the following figures, from which it appears that the Irish physicians have almost banished the small pox from their land, as St. Patrick is said to have banished the

snakes. Whereas in the period 1830-'40, and '40-'50, and 50-'60, the respective annual mortality had been 5,800 and 3,827, and 1,272; in the years 1864-'65, '66, '67 and '68, the respective annual mortality was 854, 347, 187, 20 and 19, respectively.

For thirteen years in Copenhagen and eight in the Duchy of Baden, not one death from small pox occurred. For many years before vaccination had been compulsory. During the most prevalent and fatal epidemics of small pox that has been seen since the time of Jenner, reaching from 1871 to 1873, New York City, when compared with other cities, had a very small death-rate from this disease, although the epidemic tendency was fully manifest. The New York Health report says: "This immunity was owing to an unparalleled amount of vaccination, such as in the system and magnitude of the work, no other city in the world has accomplished, to the prompt isolation of patients and the means used for destruction of germs of contagion, disinfection and fumigation."

This is but another proof that the outbreak of an epidemic of small pox is merely the public notice which nature gives of the neglect of vaccination.

Says the report of the Philadelphia Board, in the year following the fearful prevalence of the scourge in that city: "It would be idle to attempt to discuss the subject of the prophylactic (or preventive) powers of vaccination. It has been indubitably proved that small pox, during the great epidemic that has recently swept over the whole of the world, prevailed in proportion to the neglect of vaccination. By this neglect the lives of citizens must continue to be exposed to the dangers of an eruption of this most terrible disease, and the business interests and prosperity of the community be liable at any time to be seriously damaged."

Yet in the face of these facts the physicians of our State are well aware that multitudes of the children born are left without this protection.

We have no accurate State statistics, but the testimony of physicians is uniform in this regard. Where statistics have been accurately kept they show a neglect even greater than would be inferred. The births in Philadelphia, says the report of 1873, are 25,000 annually, and but 5,685 vaccinations were performed in 1873. This was about the usual yearly average except in 1871 and 1872 when small pox prevailed. In 1871 there were 30,326 vaccinations, and in 1872, 18,198. The contrast shows the usual neglect. Pestilence and death seem to be the indispensable necessities for arousing the people to the claims of preventive measures. If, in order to teach this lesson to others, your child or mine must fall a victim, or your store or mine must lose its customers, because the family next door has the small pox, we are not slow to realize that it would have been better to employ prevention sooner. What

some one calls the "wholesome alarm" of an epidemic might well be forestalled by wholesome statesmanship.

The New Orleans Board of Health for 1873, says: "1,300 cases of small pox and varioloid have occurred during the year. In assigning the responsibility for the prevalence of this preventable disease in the city of New Orleans during the year, it is to be remarked that the law of the State which gives the Board of Health its powers and by which its duties are defined, does not mention the subject of vaccination."

In view of these specimens of hundreds of other facts which might be adduced, we simply claim that the masses should, by State intervention, be informed of such truths as these, that vaccination should be made easily accessible to them, and that in a State so exposed to all epidemics, and in a State which provides free education for all its children, it is not oppressive to require that those attending school should have a certificate of vaccination, or a certificate authorizing its temporary postponement, from the trustees or a health officer. We do not ask severity of methods or compulsory law too much in advance of popular sentiment, but we do claim that such a subject comes directly and pressingly within the purview of State legislation. They should furnish the persuasion of information and to a proper degree the requirement of law.

#### CHOLERA.

Cholera is another of the epidemics which, by the rate and rapidity of its mortality, evidently does not offer large opportunities for treatment after its invasion has been made. Most of our dealing with it must therefore be preventive. It has established itself so thoroughly as one of our epidemics that it well behooves legislation, by advice or enactment in advance, to ward off its deadly attacks.

We may differ as to the precise nature of the choleraic poison, and leave this for science to determine; but we know the conditions of its propagation. These are properly within the controlling agency of the State.

If we can break up the nest in which it hatches, we almost as organically clear ourselves of it as if we could break the egg or destroy the germ.

"Cholera," says Simon, "derives all epidemic distinctiveness from filth, and especially from excremental uncleanness."

Says Upham, "in times of epidemic influence, any defect of hygienic and sanitary conditions in and about a person's residence, if the system be otherwise predisposed through want, mental or physical exhaustion, anxiety or other depressing causes, tends to precipitate an attack, while under other circumstances we might

be able to withstand the general epidemic tendency and ward off the disease."

The experience has now been too oft repeated to permit of doubt—that those cities which are threatened with the epidemic may quite thoroughly protect themselves by the rigid application of well known laws of ventilation and cleanliness and by well known methods of disinfection.

Says Dr. Culver, in his report of the epidemic of 1866, in Hudson county: "There was a coincidence of local with atmospheric causes."

Says Dr. Wickes, of Orange, in review of the report of Dr. Cooper, of Camden, for the same year: "The experience of the year in this town, as well as that of other towns named in this report, afford convincing evidence that cholera ought to be prevented by the removal of the causes which tend to develop the disease, and that in almost all cases it may be arrested and put out by properly and promptly cleansing and disinfecting the infested districts." The 16 deaths in Bergen occurred in direct connection with the foul condition of the Lodi Poudrette Manufacturing Company.

Although in all such cases a few fall victims to the conveyed contagion who are in the best hygienic condition, yet it can only gain epidemic headway by unsanitary propelling forces. It was not a vain boast of Dr. Hamilton, in the fearful epidemic on Blackwell's Island, in 1866, that if the Health Board would give him power he would expel the cholera in five days. They accepted his proposal and he made such thorough sanitary cleansing and regulation that the pledge was fulfilled. The disease commenced to abate as does a freshet when its sources are cut off.

Says the report of the Cincinnati Board of Health (1873): It is a fact worthy of record that from the time the sanitary organization was completed and the suggestions and instructions of the Board of Health fully carried out, the disease was speedily confined within safe limits and in a comparatively short space of time completely under control, except in cases where the recommendations of the Health officer and Board of Health were disregarded.

Yet, whenever the epidemic visits such a State as ours it finds Boards of Health in many cases inoperative, and complaining of defect of powers. In most villages there is no authority whatever to act in the premises.

When the cholera broke out in South Amboy, in 1866, the very bed on which the patient died was sold at auction. When a physician had sought in vain for power to obtain it and to use disinfectants, he only saved the town from a fearful risk by seizing the articles and burning them by active and illegal force.

No State law provides for contingencies like this, which are liable to occur in reference to any epidemic disease, and authority as



to which might safely be lodged with School Trustees or Township Committees or other officers. With knowledge of prevention now possessed, why must we allow an epidemic to levy its death-rate in order to move to action? Then we may abate, but can not fully control. Over our losses we can find some relief in feeling that they are not as bad as they might have been, and must smother the reflection that they need not have been at all.

#### FEVERS.

The various forms of fever make up a large proportion of the sickness to which the adult population is subject. They are often tedious in their convalescence, and both, in cases of fatality and in their protracted recoveries, make a large tax upon the comfort and the industrial capacities of our citizens.

Of these, typhoid fevers and the various forms of malarial fever are the most prevalent in this State. It is well to inquire how far they are dependent upon conditions which are abatable.

Typhoid fever happily does not prevail to the degree that it does in some of the New England States. Yet, as appears from the medical reports of the last fifteen years, its outbreaks in our State are sufficiently numerous to demand careful attention. So prevalent is the disease in Massachusetts that a very careful investigation into its causes has been made by inquiries and facts elicited throughout the entire State. The result accords with that of similar inquiries made in England and on the continent, and in different parts of our own country. It is found that in the large majority of cases foul water and defective sewerage are the incubating conditions. Over and over again has it occurred, after there have been a few deaths and many sicknesses, to find that the privy sewer had made connection with the well, or the sewerage of the house had become stopped, and so the soil had become so saturated with decaying organic material as to have become, as the great German investigator, Pettenkoffer, expresses it, "typhoid ripe." We can not turn to an authority on this disease without finding the most abundant evidence that the fever has a specific origin, and is owing to a combination of causes which are artificial; the result of our modes of aggregation and living, and as such within the reach of abatement.

Commencing, and securing its virulence from some foul well or privy, or drain or cellar, or from some other neglect of hygienic precautions, it passes from its nest, and often wings its way to homes adjacent, which are not thus contaminated.

The eighty cases in one of the tenement houses in Stuveysant square, New York City, in 1866, did not fail to leave their results in many a palatial residence in the vicinity. It was purely a manufactured disease. It would have been both life-preserving and

economical had municipal authority cleansed the premises before it had incurred the losses. The wisest maxim of political economy that is practiced by many in reference to health, is "to lock the stable after the horse is stolen."

Says the New York Health Report, for 1869: "The febrile contagions unquestionably will, in a more advanced stage of sanitary knowledge, or by the practice of strict domestic and public hygiene, be almost wholly restrained and expelled from well-ordered communities." The outbreak of 1869, says the report for 1870, was controlled by sanitary means. These facts accord with the testimony of manifold health authorities in other localities. Science can even point to districts in which the fever was once prevalent, where it has mostly ceased to exist, since the application of hygienic measures. The Citizens' Association of New York says: "It is well settled as a medical fact that this fever can be controlled and removed by human agency." In England, contamination of drinking water by animal excrement, is accepted as a leading cause of typhoid.

The fever, however, from which our State, in common with the other Middle States, chiefly suffers, is that known as miasmatic, embracing the various forms of intermittent, or chills and fever so called, remittent, bilious, etc. It probably, more than any other one disease, interferes with our productive labor, and is not only like an epidemic but resident, inflicting an annual tax upon the industrial resources of our State, and upon the comfort of its citizens.

In a review of the State medical records of the New Jersey Society for the last fifteen years, we find such statements as these:

In Warren county, the report says: "Intermittent and remittent fevers have long formed a staple portion of the diseases of the valley of Paulus Kill."

The report for 1871, referring to another part of the county, says intermittent and remittent fevers prevail so extensively through the summer and autumn, that they may almost be said to have become epidemic.

In Hunterdon county, the reporter, speaking of his district, says: "All diseases, among the inhabitants, are more or less influenced by marsh miasmata."

In Sussex county, the report for 1871 speaks of intermittents and remittents, as everywhere more common.

The report for 1873, of Bergen county, says intermittents and other forms of malarial disease, prevail to a considerable extent.

The Hudson county report says (1872): Malarial diseases seem to become more prevalent each year. The report for 1873 says: "We shall always have remittent and intermittent fevers, and all those insidious and indefinable forms of ill, resulting from miasm, so long as the vast tracts of marsh land, seen in the county, remain unimproved, or on a tide level."

Dr. Culver says: "It is the ever prevalent fever throughout the county." In Passaic county, the report for 1873 says: "Intermittent fevers continue to prevail in their due seasons."

In Essex county, Newark has at times suffered greatly from miasmatic fevers and dysentery. Reports in different years refer to its prevalence in adjacent sections of the county. Even late this fall it was prevalent there.

In Middlesex county the reports show that it has prevailed wherever there were local causes found to produce it.

The report of Mercer for 1872 says, we have a good deal of intermittent and remittent, and those most familiar with the Delaware river, will say of it, as of the Passaic, that it has much adjacent land which needs reclamation.

Dr. Thornton, of Burlington county, says: "We are never rid of periodic fevers, and at all seasons the 'ague struck' are to be found, both on the ridge-land and the fens."

In Camden county, reference is again and again made to the prevalence of these fevers, and also to their marked abatement under drainage about Camden and in some other sections. Reference is also made to the fact that the malarial influence gives fatality to dysentery, as it is well known to form a disturbing element in other bowel affections. These counties are not singled out, but so far as our records show, there is not a county in the State but that needs attention as to certain malarial districts in it. A careful review of the records of the last fifteen years shows an amount of evil upon us from this source which surely calls for abatement, if it can be reached.

These facts are not more suggestive than similar ones which are adduced as to New York city, as to localities even on the Hudson, and as to many parts of Long Island, but yet are such as rightly call us to inquire whether any prolific and wide-spread cause is at the basis of this evil, and whether anything can be done to mitigate it.

On this point we have some testimony:

The report of the Citizens' Association of New York says: "The nature of the marsh malaria may remain undetermined for another generation, yet its causes are now so well understood, that the rustic yeoman and the rural villager know that fever and ague disappear under the influence of thorough drainage and agriculture, and that these simple agencies are as effective for the prevention of malarial maladies as quinine is specific in their cure."

Says the New York Health Report for 1868: "No fact is better established than that the thorough drainage of grounds which produce the malarial poison removes the conditions on which the generation of the poison depends."

Districts almost uninhabitable, from the periodical appearances

of malarial fever have thus been rendered comparatively healthy, under circumstances apparently unfavorable to general salubrity.

As an example of defective drainage and overflow, the report of 1869 gives an account of Stapleton and the regions about, with the bills of mortality. On Long Island, in one of the townships, out of sixty families bordering on Juniper swamp, in a radius of half a mile, forty-three were found suffering from malarial fever.

"Defective drainage," says Inspector O'Leary, in the report of 1870, "is the root of all the insanitary influences which curse the upper end of Manhattan Island."

Says Morean Morris, Sanitary Superintendent of New York: "Medical and sanitary science and experience forbid the erection of dwellings upon an undrained soil. Heat and capillary attraction bring to the surface that moisture and dampness which should have been removed by sanitary engineering. The result is malarial fever and consumption, suffering and death, as punishments for neglecting applications afforded by the light of science."

It is well to bear in mind that, from various causes, many of our cities are becoming obnoxious to malarial disease, not less than low regions of the open country.

The results of well devised and well executed drainage in overcoming this great source of disease is now universally acknowledged. By proper drainage and sewerage, the west end of London, once a malarious marsh, has become the most popular for residence. Portions of Paris have a similar history.

Throughout England, drainage has come to be regarded as still more important in its bearings upon health than upon agriculture.

The Massachusetts reports, and those of New York city, show results highly satisfactory, which have followed its adoption as a sanitary measure.

In our State, the State Geologist, and others most familiar with its topography, recognize large tracts of territory needing drainage on an extended scale. The several thousand acres overflowed by the Passaic and the Warren County Great Meadows, and places along the Hackensack, the Delaware, and other rivers, as well as marshes near lakes or ponds, or where natural water courses have been interrupted, stand much in need of attention. The following communication from Prof. Coots more fully sets forth the facts:

"Lands on which stagnant water lies during a part or the whole of the summer, are fruitful sources of disease; and there are seasons when almost every family near them is afflicted with fevers, chills, intermittents, or other malarial disorders. There are many tracts of such land in New Jersey; some of which are so large that they have been objects of public attention and interest, and may very properly be cited here.



*The Drowned Lands on the Wallkill*—Lie partly in this State and partly in New York. They comprise an area of 25,600 acres, of which 10,000 acres are in Sussex county, in this State, and 15,600 acres in Orange county, New York. This whole tract of land is liable to overflow, and to be covered with stagnant water for many days together, after every heavy storm. The vegetation on such grounds is coarse and almost worthless, and the whole country is discredited and injured by the damage to health, and the waste of so much valuable property. The obstruction to the drainage is at Hampton, in Orange county, and could be removed by cutting an outlet canal for two miles, by which a fall of twenty-four feet could be obtained, and the water which now lies dead in the Wallkill channel, would be set in motion for twenty miles above. To accomplish this desirable end, joint action with the State of New York would be required—but its advantages, both sanitary and economical, are so great that no opposition need be feared—and the relief of the suffering inhabitants should be attempted at once.

2. *Great Meadows on the Pequest, in Warren County*—This tract of marsh and swamp covers 5,500 acres; it is eight and a half miles long, and in some places is one and a half miles wide. It is in a most beautiful valley, bordered by mountains, and promising to be one of the most delightful retreats in the State; but it is rendered unsightly, unproductive, and more or less insalubrious by this undrained tract of land. The obstruction is in the bed of the stream, near Danville and Vienna. A vigorous effort is now being made to lower the channel of the outlet, and so let off the water that heretofore has remained to poison vegetation and destroy health.

3. *Flowed Lands on the Passaic and its Branches*.—This stream is remarkably crooked, being turned from its direct course by the long and curved trap ridges which are known as Long Hill, Second Mountain and First Mountain, and flows with a sluggish current for nearly thirty miles out of its direct course, and along the foot of these ridges, until it falls over the rocky ridge at Little Falls. The stream has so little current that with any heavy fall of rain it overflows its banks, and floods the flat and swampy grounds along its borders for days and sometimes weeks together. The tracts liable to overflow from this cause comprise not less than 16,000 acres, and if the great swamp is included, the aggregate of acres will be about 20,000. The freshets which cover these flat lands are destructive to property, a hindrance to the improvement of the country, and most disastrous to health. In some years chills and fever have been almost universal throughout the district surrounding these flat lands, and occasional instances are found of fevers of a malignant form, which can be traced to the malarial atmosphere which overhangs this wet ground. The causes of this sluggish current, and consequent overflow, are to be found in natural obstructions in the stream, not difficult of removal, but which have been greatly ag-

gravated by the construction of mill dams upon them, so that their injurious effects are increased, and their removal made both unpleasant and expensive.

There are many other tracts of lesser magnitude which need drainage, but they need not be enumerated here. It would be a wise economy for the State, and a just consideration for the health and property of the persons who suffer from this imperfect drainage, if the channels for drainage were opened, even if the State itself for a time afforded pecuniary aid.

As a specimen of the results of drainage, we may quote from the report of Camden county for 1872.

Says the reporter:

"As a general thing our malarial fevers have very much diminished within a few years, owing, we believe, to a better system of cultivation and drainage in the county, as well as our improved system of sewerage in the city of Camden, the number of acres of swamp and marshy land being very much diminished within the last few years."

A striking instance of the increased health of a neighborhood may be mentioned in this connection. Newtown creek, which was once a navigable stream, was dammed off at its mouth more than eighty years ago, in order to save the expense of meadow bank along its margin.

The outlet of the river was by means of sluices, with doors to keep out the tide. The bed of the stream, for want of sufficient current gradually filled up to a mere ditch. The meadow lands at the head of the stream were often covered with back-water for days at a time after heavy rains, and the meadows became wet and marshy.

All the inhabitants along the course of the stream were habitually afflicted with intermittents and remittents during the summer and quite late in the fall.

Two years ago the embankment of this creek was carried away during a freshet, and the whole extent of meadow land, amounting to seven hundred acres, was flooded twice during every twenty-four hours with a fresh overflow of water.

Since this has been the case the health of the inhabitants has very much improved, and intermittents have ceased to a very great extent.

So well convinced are the residents that their increased health is owing to the removal of stagnant water, that they have neglected to repair the break in the embankment, and have procured legislative authority to entirely remove the dam, and let the tide have free access to the channel of the creek, preferring to incur the expense of putting up banks for their meadows, for the sake of the great improvement in their health.

Just as the topography and geology of a State are subjects of legislative concern, because of the material resources contained in the earth, so, also, the health of those moving upon it is a material resource. "The State should turn its attention to plain facts bearing on local causes of disease, and even if not yet prepared to enter upon plans of public improvement, should indicate where they are needed, and point the attention of local authorities to their desirableness. No law is much stronger than the public opinion alongside of it, and in health matters it is sometimes the just province of legislators to create right public opinion.

#### CONSUMPTION.

Consumption is so prominent a source of mortality, as well as of tedious and wasting disease, that its causes have frequently been a subject of investigation. In 1867, 1868 and 1869, 14 per cent. of the deaths, in the New York sanitary district, occurred from this cause, and this represents more than double that proportion of adult population. Massachusetts has instituted a careful inquiry throughout the State into the causes of the alarming prevalence of this disease, and English sanitarians have also turned large attention to the subject. It is all the more important, because by its hereditary tendencies, it involves not only the loss of the person, but evil to his posterity, and so has far-reaching results on population.

These examinations have shown the disease to be largely dependent upon a deterioration of physical power, directly resulting from artificial conditions of living, or from a neglect of preventive measures, with which sanitary science provides us.

The imperfect ventilation of the homes and workshops of the people, neglect of cleanliness, improper methods of heating, errors as to food, and the living amid water-soaked, undrained surroundings, manufacture diseases which, otherwise, would not prevail to the great extent they do.

Dr. Bowditch, of Boston, the most extensive practitioner of New England in lung disease, by a series of inquiries, extending over a long period, and throughout the State, gives evidence that imperfect drainage is among the most prolific causes of this disease.

Dr. Buchanan, under the direction of the medical officer of the privy council, England, 1866-7, made wide investigations with the same result.

In the eight chief towns of Scotland, it has been shown that consumption prevails in proportion to dampness of locality. "A prominent cause of consumption," says another, "is the want of ventilation in houses. As soon as cold weather comes, people shut up their houses as tight as possible, and then, with stoves, heat them to such a degree that they become very sensitive to cold in going

out of doors." There are multitudes of other facts, which place consumption in the list of diseases largely preventable and abatable. The people need information as to causes operating in our own State in this regard. While the cure of disease, after it occurs, falls within the realm of a profession, its prevention falls within the vision of the statesman. We cannot trust for this to general information, for this does not reach the very class who suffer most, and the greed of gain leads to the building up of unhealthy sites, and the crowding of population to such a degree that it must, in some measure, be regulated by law. Law must become an educator of the masses as to the consequences resulting from wrong living, or wrong working.

Very many diseases depend upon causes, over which the public have more control than the physicians, and the government more than either.

"In every district," says Simon, "which has a large in-door industry, the increased mortality of the work-people is such as to color the death return of the whole district, with a marked excess of lung disease." Dr. Whitely, of Patterson, says (1866): "From the fact that so many of the inhabitants of this city are employed in factories and work-shops, consumption is of frequent occurrence among them."

#### ALIMENTARY DISEASES.

Diarrheal diseases, especially dysentery and the infantile cholera of children, which consigns so many to prolonged and expensive sickness, or untimely death, is so far recognized as dependent on surroundings, that often the treatment of such cases consists in providing change of locality. Filth, and the bad conditions consequent thereupon, or improper food, or imperfect ventilation, such as is often found in good appearing dwellings, have much to do with the prevalence of this class of diseases. It is quite possible to draw through a city a line showing the death range of these diseases, or to foretell beforehand where the slaughter of the innocents will be conducted with the greatest rapidity. Is it not better, by city ordinance, to remove the pestiferous and recognized causes of such mortality, and to apply these preventive methods which belong to corporate authority, and not to medical treatment?

Says Simon, chief officer of the British Board of Health, "Nothing in medicine is more certain than the general meaning of high diarrheal death rate. So far as I know, there is a practical certainty, that in such districts, the population either breathe or drink a large amount of putrefying animal matter."

#### ZYMOTIC DISEASES.

There is also a whole series of diseases, such as scarlet fever,



measles, mumps, diphtheria, croup, whooping cough, erysipelas and many other diseases which are classified together as diseases "induced by some specific body, or, by anomalies in the quantity or quality of food, or as the products of vegetable and animal decomposition, or specific emanations from the body in a state of disease."

These diseases are generally spoken of together as zymotic or fermentive, or foul air diseases, and in some seasons of the year make up one-half of all causes of death.

These propagate in congenial soil. If you drop even leaven on a board, it will not raise the board as it does bread, and so disease must have its essential conditions.

It is found, says the New York Health Report of 1867, that "with few exceptions, the local filthiness, and neglect which favor the propagation of any one of the zymotic diseases likewise favor all. So far as we know, all the low forms of parasitic life and injurious vegetation occur only in foul air, or amid some sort of excremental and putrescent matter." The value of disinfection, says the New York Report of 1870, has been fully established by different sanitary authorities, and the kinds best adapted to the various forms of putrescent matter, and for the purification of clothing and dwellings, has been decided upon after making the proper chemical tests."

Such diseases, if not wholly preventable, are abatable to a very great degree, and where invasion has taken place, very much is to be done by prophylactic measures, and by change in surroundings to mitigate the intensity of the disease. In scarlet fever, for instance, the physician who is called to a malignant case, often has to recognize that it is too late to save his patient, but if he is intelligent in sanitary matters he will, if possible, make such change in regulating surroundings as will save other members of the family, the neighborhood, and the district school. Often he will be unable to apply these, unless he can call to his aid municipal authority, and even then, many will have been lost in order to teach the need.

Lives may be sacrificed by failure in physicians to adapt remedies to disease, but thousands, too, are sacrificed by the failure of the State in affording the application of methods well understood to promote prevention and abatement. "Sanitary provision of necessity be a part of civil legislation, and concerns the country with its fens and marshes, its filthy cellars and outyards, its garbage heaps, and cesspools without outlets, as well as the corporate city where concerted and regulated local action is easier secured." The lawmakers need to know how extended is the scope of preventive science as already proven, and how hopeful are efforts in this line for the betterment of all classes.

They need to know that feasible methods are at hand to preserve the population, to ward off disease, and thus add to the working capital and personal comfort of the masses.

Says the New York Health Report of 1870: "The contagious principle of scarlatina, though very diffusable, and of intense activity, can be effectually destroyed by agencies readily employed in every household, while many of its most fatal complications may be prevented by care in treatment." So as to many other diseases. We have thus alluded to a few of our most common diseases, in order to show how great a number of them come within the range of preventive legislation, and are to be looked after by the State, which has charge of the welfare of its citizens in the way of interrupting the causes, rather than by the physician in his attempts to rescue the citizen after he has been hurled into the vortex.

#### DRAINAGE IN ITS MORE GENERAL BEARING.

It is in place next to notice some of the most prevalent of the abateable conditions and occasions of disease which are within the reach of legislative enactment, or of preventive State advice.

We have already referred to miasm as the cause of that large group of our diseases known as miasmatic, and to the influence of drainage upon these. It is also a well recognized fact that the same influence gives character to dysentery and many diarrheal diseases, and that neuralgia is often dependent upon miasm.

Thus we see in various forms of disease evidence of this influence as an important factor. Whatever may be the questions started as to the germ of this miasm, its connection with undrained lands and with extended vegetable decomposition, cannot be doubted, and the two preventive methods are the draining of the soil, as a deliverance of all stagnant waters, and the appropriating of vegetable decomposition by placing crops upon the land.

So definite are the results following from this cause when systematically followed out, that the whole character of sections becomes changed, and this class of diseases depart before the progress of intelligent occupation of the lands.

There are localities where our citizens need to be pointed to this prevalent source of disease, so that, by united action, proper tillage and drainage can be secured, and both health and increased soil productiveness result.

It is well known that as an agricultural measure, on the score of mere profit, no method of farming has more approved itself than that of underground drainage, since water-soaked soil, or water in a state of permanency, is never advantageous to crops.

But it is not only on miasmatic diseases that water-soaked ground exerts a power. Dampness and quick alterations of temperature, which result from excessive ground moisture, and the expulsion of

the air from the soil, thereby has a wide reach of unhealthy influence. The chairman of the section on State Medicine and Public Hygiene of the American Medical Association (1874), says: "Of all the preventable causes of disease throughout the country, defective drainage is the most prolific." Air in the ground will oxidize much organic matter, but stagnant water excludes it.

Dr. Bowditch, in the examination of 45,000 deaths from consumption, in Massachusetts, for the last ten years, shows that its distribution in sections and townships is very irregular, the mortality in some places being among the same classes of population two or three times as great as others. He was able to show how much this depended upon difference in drainage and ground moisture.

The state of soil influences, the atmosphere, and all the class of lung affections and diseases arising from irregularity of temperature and moisture, are much influenced by telluric or ground conditions. Attention has of late been more especially directed to cities in this regard. In our rapid American building and crowding, little attention is paid to the underground, and hence localities are covered with dwellings where persistent and located dampness are forever domiciled with the indwellers, and not only fevers, but rheumatism, neuralgia, consumption, and manifold lesser ailments result. In a part of New York city, notorious for its sickness and death rate, sanitary engineering recently revealed that it nearly followed the course of the natural drainage of the district, which had been completely obstructed in the erection of a series of buildings, these forming the reservoir or cesspool toward which tended the whole flow of the district.

Drainage in cities is a question entirely distinct from that of sewerage. From geology, agriculture, sanitary, engineering and practical medicine, there is now accumulated an amount of information on this subject, which, so far as it concerns preventive hygiene, belongs to the sphere of legislation. The facts of themselves are sufficient to lead citizens to a greater attention to those which are *vital* interests in a generic sense.

#### WATER SUPPLY.

A contaminated water supply is another source of disease and ill health, to which the attention of our citizens needs invitation. It has long been a recognized fact that the infusion of organic matter into wells, may so befoul them, before there is any indication to the senses, as to produce serious sickness. Over and over again has it occurred that typhoid fever or other disease has counted its victims before the fatal cause was discovered. Well water being the under drainage of the soil, naturally partakes of the mineral and organic matters which it finds in it capable of solution. Fortunately the soil has some powers of percolation, disinfection, and

purification; but, if noxious organic or inorganic matter abound, some of it is sure to find its way to the well. It generally is a drain for an area equal to its depth. The organic matter is far more of an evil than the animalcules, which even sometimes help to remove it. How often are the cesspool, the sewer and the privy, situated within a near radius?

How often is the surrounding soil in some way saturated with the products of animal and vegetable decomposition. "It is sickening," says one, "in most country places, to observe the uniformity with which the cesspool and well are made to stand side by side, as though each was necessary for the other." It is always possible to provide a city or a town with good water, but in a village, where houses are few, money scarce, and intelligence scarcer, it is a matter of exceeding difficulty.

Wells are often superficial, or left without proper closure at the top, or their water so often filters through improper soil, that it is not wonderful that the drinking water is the cause of much ill health and feeling of unwellness, even where fatal sickness does not result. A case of peculiar sickness, falling under the eye of one of your commissioners, recently occurred, where a well revealed, a few days after, thirty dead toads and a rat. Investigation, in other sections, leave it without doubt, that an impure water supply has much to do with very many stomach and bowel derangements. In cities, where the supply comes from rivers or lakes, there is repeated need of examination as to purity, and also of expert knowledge lest water should be introduced from an improper source. Some of our cities have had large and hard experience in this direction. The influence of even mineral substances in water, is shown by the fact that stony concretions, or calculi, form from water in certain districts; and much more deleterious must be those organic animal matters, which are absorbed into the blood. There is need, too, of great circumspection as to the pipes through which water is carried.

There is the most irrefragible evidence that most water is not safely conducted through lead pipes. Cases of lead poisoning are fully authenticated as not infrequent from such conduction, and even where decided lead symptoms do not occur, it is probable that the system suffers from the irritation.

Superficial well water, says Pavy, in his able work on "Foods," may be clear, bright, sparkling, cool and agreeable, and yet possess dangerous properties.

Says Stocker, in his "Hints on Health," (London, 1874): "As sanitary science advances, it is highly probable that many more diseases will be attributed rightly to a vitiated condition of the water used as food." In the report of the medical officer of the privy council, Great Britain, it is often stated that pump-wells "are foul and unfit for use by infiltration from cess pools."



Angus Smith and Parkes, in England, and Adams, Chandler, and others in our own country, have clearly set forth the evils arising from this lead contamination. Any quantity over one-twentieth of a grain to a gallon is unsafe. In the poisoning of the family of Louis Philippe, seven-tenths of a grain per gallon was found.

Says the Health Report of the District of Columbia, 1872: "Lead pipe is the most dangerous article to use for conducting water for drinking purposes." The report on lead poisoning, in the Massachusetts Health Report of 1871, gives full evidence of evils resulting from lead, not only as to water, but as to cider and vinegar drawn through lead faucets. This whole subject of pure water supply so much needs the attention of our people, that we believe a frequent examination should be made of the chief source of supply.

"In all sanitary investigations," says Parkes, "the question of the water supply is one of the first points of inquiry, and of late years quite unexpected evidence has been obtained of the frequency with which diseases have been introduced by the agency of water."

Says Prof. Cook: "A supply of pure and wholesome water for drinking, and for culinary purposes, is of the first importance to our people. To obtain such a supply is getting to be more and more difficult. Heretofore the main dependence has been upon wells. But as towns become more thickly settled, and in the country, as habitations remain longer upon the same spots, the ground gradually becomes saturated with the waste, rubbish and filth thrown upon the surface, or these run into sinks, cesspools, and vaults; and the well waters, which are only the waters that have soaked through from the surface and drained into the wells, are spoiled. These waters may be clear and sparkling, and to those accustomed to their use, altogether pleasant to the taste, and at the same time be filthy, unwholesome, and at some seasons actively poisonous. Such waters, if left to stand till they are warm, give off a disgusting smell, and if boiled away till dry a sediment is left, which on heating betrays its animal and offensive origin, and if this sediment is finally burned it flashes like saltpetre. The use of such water is followed by disease, and an increase in the number of deaths. The streams which flow through our cultivated districts, and upon which our manufacturing towns are located, become contaminated with the filth from sewers, the waste from manufacturing establishments, and the washings of the streets, so that they are entirely unfit for supplying water for domestic and household purposes, and we must look to the mountains and thinly settled portions of our State for a supply of wholesome water. There is an abundance of such water to be found in the northern, middle, and southern parts of the State, and the public interest will be consulted if attention is called to these sources of supply, with details of location, quality, and amount.

Filtered rain water can be safely substituted for well water in many places, and it is coming into use extensively where its excellence, and the economy of its collection and use is understood."

#### SEWERAGE, EXCRETIONS, ETC.

The accumulations and excretions incident to life in the household, have long been recognized as the source of evil to health, unless properly disposed of. No one can study the conditions of life, either in city or country, without recognizing it as one of the chief problems of sanitary science, to know how, in methods most consistent with health and economy, to dispose of the garbage, offal, waste water, and excrement, which must accrue in every house-living condition of society.

The chief medical officer of Great Britain said, in 1865, of many old towns in that country, that "town after town might be named, with thousands upon thousands of population, where there is little more structural arrangement for the removal of refuse than if its inhabitants were but tented there for a single night.

"Although the foul emanation from decomposing organic matters, human and other excrements, etc., may not *originate* disease germs, they undoubtedly so affect the air as to produce various deranged states of health favorable to the development of typhus, and this predisposition seems to be exactly analogous to the preparation of the soil for seed."

"Not only does polluted air throw the system from its balance, but there is reason to believe, may furnish the pabulum necessary in many cases, to the propagation of the organic germ."

We cannot even depend upon the test of foul odor, although this is often one of nature's warnings. Says the Massachusetts Report, of 1871: "Bad smell is no certain indication, or perhaps we should say, no certain measure of the danger to health. There is reason to suspect that the fever producing poison is odorless, and that under certain circumstances, it may be set free from decomposing substances before the foul smelling compounds of hydrogen come to give us warning."

It is not safe to leave questions as to sewerage, garbage and fecal matter to the option or ignorance of individuals, or even of each separate corporation.

It is the business of the State to instruct as to such matters, and to have at least such intelligent prohibitory legislation as shall warn against mistakes, and lead the people to seek their own highest interest.

What to do with garbage, how best to regulate drains and sewers, how to manage the out-door or in-door commode, and how, in every respect, to dispose of that which falls off (offal), in every household, so as to secure the greatest cleanliness, is a matter of

intensest import to the welfare of every family. Wise is that State which looks closely after its homesteads, and instructs its people as to them.

Physicians are well aware that our cities, and even our villages, are suffering from what are called their in-door conveniences, which are too often consigning females to imperfect health, and only partially saving men from like prostration, because they find vent and ventilation in the open air.

Multitudes of respectable families have out-houses which are foul and unhealthy by reason of imperfect building, or irregular cleansing. This is not because the people are uncleanly, but because of real embarrassments in securing cleansing, and a want of knowledge of proper methods and modes of appliances, as also of the consequences of neglect. Not only the foul privies of school-houses and hotels and railroad stations, but rows of such in country villages often have more to do with the sickness of children and the debilitated feeling of adults, than some suppose. These manufactories of foul air are health depressants and vitality reducers, even where they do not prostrate their visitants. House sinks, stationary wash tubs, ill ventilated drains and sewers, stagnant cess-pools, cellars, with decaying vegetables, and in or out-buildings, foul from animal emanations, cause many a headache and many a weakness not registered in the bill of mortality, and yet sapping the vigor of effective vitality, and lowering the standard of forcible strength.

We sometimes doubt over which most to be distressed, the non-survival of some or the miserable dragging out of life by others. Manufactured invalidity may not be as deplorable as forced or fatal disease, but it is certainly one of the most uncomfortable of acquisitions—one for which American society is becoming proverbial—having its cause, not so much in a physical degeneracy of race, as in local and home surroundings, unfavorable to robust life.

Until we have more, either of executive, legislative or judicial oversight of health as a great public interest, and so have our people guarded, instructed, or restrained—we shall have to bear an increasing onus of ill health—a tax on the laboring capital of the State far more oppressive than a dollar tax for a cleansed out-house, or an equal amount for a drain trap, which will prevent the inflow of noxious gases from the city sewer.

It is an indisputable fact, known to our best sanitarians, that at present no large city is in proper health condition that has not some system of house inspection, by which, at least before the summer opens, it is known what is the condition of out-yards, cellars, basements, and the connections of sewerage. We can even point to country villages where neglect, in these regards, or the use of ill contrived cesspools, or the conveyance of open drains along the street, or the use of small natural streams, or the casting of all

forms of garbage into the streets, is a source of evil as well as unsightliness, and yet no law can restrain the offender.

Where a definite relationship between disease and known exciting causes is well understood, we must not wait for cures, but so inform and direct the people as that they shall avoid the risk.

The fact that so many escape only proves that some resist disease better than others, or that some wind or storm or other force has kindly intervened to ward off the evil. The child dies of its cholera infantum, and here and there an adult with erysipelas and typhoid fever, even though the masses escape. Our business is to guard against prolific and well-known sources of disease, so that in times of excessive heat or moisture, or sudden epidemic influences, a sudden stirring of filth into decomposition by special atmospheric and telluric influences shall not find such an overplus of foulness as must result in excessive mortality, or in a lowering of the standard stamina. That kind of legislation which instructs the people as to social evils which need to be and can be avoided, and which, by co-operation and direction, assists in mitigating, is preventive of so many physical, social and pecuniary burdens that it well behooves the attention of the State to be turned to the subject.

Nor is the evil of imperfect removal of refuse confined within narrow limits. Even where sewers are of sufficient calibre and fall for carrying the sewage, the foul air in the tubes is apt to permeate and penetrate houses all along the line. These, unless guarded become distributing reservoirs, through which the foul air finds access to parlor and bedroom, and is inhaled in the very best apartments and the best houses. The air in the house drains is often found worse than in the main sewer. The heated and close condition of the houses in winter favors an upward current, and this may be one reason why some fevers and some of the zymotic diseases flourish most in the winter or early spring. There is reason to believe that many of the traps or valves to prevent this inflow are defective, and the water in them is often exhausted by suction from beneath. We know not, says Mrs. Plunkett, how many heads of families have died before their time by what has been called a mysterious dispensation of Providence, who lost their lives by inhaling the poisonous odors of surface drains. (See Mass. Report of 1874.) Says the New York Health Report of 1867: "As in the case of Prince Albert, who died of typhoid fever, at Windsor Castle, the existence of the fever infection in a sewer that receives the excrement of fever patients, in a low and distant quarter of the town, will communicate its fatal poison to residents of a palace."

Nor is the evil confined to large cities. In fact some of our largest cities are guarding such matters with discrimination and outlay, while well populated country towns and villages are left without either drainage or sewerage. Many a brook flowing through such towns becomes the receptacle of improper matter,



until at length the scum shows it well and thoroughly fouled. Even where this is admitted, some such towns as Paterson show how slow is the abatement of the nuisance. Dr. J. H. Love, in a report for Essex county (1866), says: "A prolific cause of disease among us is the want of drainage and of proper sinks or cesspools for the reception of the refuse matter which constantly is accumulating about every dwelling." The great gains which have been made in the management of cast-off material (although much still remains to be secured) encourages us to the most earnest efforts. The great teaching is that the curtailment of these necessary evils of congregated population within a limit consistent with health, depends upon our power to make each individual household do its part in preserving cleanliness.

To do this we must provide the best and easiest methods for disposing of all rejected matter, and make it, as far as possible, the pecuniary interest of occupants properly to dispose of material. We must, also, in case of the lower classes, see that it is done, and so instruct them as that they shall appreciate its importance to their health and that of the community, and thus in part popularize law before we enforce it.

It is often because of neglect of information, or defects in methods, or by unnecessary expensiveness, that desirable hygienic measures are delayed. What we need is to put, as far as possible, all households, and especially the females, in possession of the real facts; to afford them easy riddance from accumulated filth of every kind, and thus to have the law aid and abet what is shown to be for the public welfare. State Boards have thus been of great aid to municipal authorities, as well as to places in which no health officers exist.

#### TENEMENTS.

This leads us to say that the whole system of house living, in most of the cities of our State, needs the careful study of the publicist and statesman. The tendency to crowd dwellings, and to crowd into them a greater number of human beings than were ever before packed into the same closed space, has been one of the special manifestations of the nineteenth century. This tendency may be noticed relatively by comparing Philadelphia, sometimes called the "City of Homes," with some other cities. At the beginning of 1873 it had 124,302 dwelling houses or residences of families, some of them being also used in part for stores or manufacturing purposes. The dwelling houses exceeded in numbers those in any other city in the United States. There were 60,258 more than in New York city in 1870, when the relative number of dwellings was, in New York, 64,044; Philadelphia, 112,366. There were 78,468 more than in Brooklyn in 1870, and 84,627 more than in

St. Louis, 83,952 more than in Baltimore, 79,632 more than in Chicago, 94,679 more than in Boston, and 99,752 more than in Cincinnati in the same year.

There were more than in New York and Brooklyn combined in that year. There were only sixteen less than the whole combined number of dwelling houses in Baltimore, St. Louis, Boston, and Louisville in 1870.

The population of these cities is very nearly as follows, according to estimates for 1873: Philadelphia, 750,000; New York, 1,040,000; Brooklyn, 435,000; Baltimore, 305,000; St. Louis, 450,000; Boston, 276,500.

So New York, for instance, with 1,040,000 inhabitants, has 64,044 dwelling houses, while Philadelphia, with 750,000, has 112,366 dwelling houses.

The number of persons to each dwelling in Philadelphia in 1873, averaged 5.99, while the average in New York is about 10.6. The Philadelphia report says:

“Tenement houses, such as are the abomination of most large cities, are scarcely to be found, and this source of increase of mortality is therefore absent.”

Our cities seem to copy most after New York and Jersey City. Newark, Paterson, and Trenton, can in their degree, give full specimens of an over crowded tenement system. The necessity of economy leads the families of mechanics and factory laborers to crowd into few rooms. While the evil is not yet beyond control in our New Jersey cities, it is all important that the civic attention be directed thereto.

We can thus prevent an evil which is sure to entail a long train of ills, both morally, socially and pecuniarily, on those who are thus “cabined, cribbed, confined, and wanting room.”

The working classes need to know the evils of this crowded condition, and that it is even a false economy. Over heated rooms, foul air, and consequent want of neatness, involve debility and sickness, and thus a tax heavier than rent. Those who would study population, even in its political aspects, must look into the whole question of family situation, and after the homes of the people.

It is in vain to expect good work in any department, well sustained and continued to vigorous old age, unless there is proper eating, sleeping, and living.

It is even vain to expect good morals out of those who are so vitiated by foul air that liquor and tobacco become necessary stimulants and disinfectants to overcome depression and protect them from surrounding poisons. It is even found that the desire for tea and stimulants generally, is common among the children of filthy localities, just because there is a felt want of an unnatural stimulus or nerve to control an unnatural depression. It is high time that the State approached all these questions from a stand-point of pre-

vention rather than from that of provision for the results in hospitals, asylums and prisons. It is grand to provide all these where unavoidable necessity occurs. It is grander still, and cheaper too, to meet the sources of these, and dry up some of the exciting conditions of the evil. We can no longer plead ignorance. Science has moved forward with a broad and steady tread. Philanthropy, with a finger as sharp and defined as any on a sign-board, has pointed out certain causes and concomitants of contagion, of ill health, of disease, of enfeebled race, of enfeebled labor, and so of enfeebled capital.

It is notorious that ill kept and crowded dwellings give us the largest percentage of mortality and sickness, besides furnishing the center for its extension to those in better condition. The results which have followed in the improved dwellings for the poor in London, under the auspices of Chadwick, Alderman Waterlow, and Mr. Allen, the mason, and our own Peabody, are highly satisfactory.

Says Miss Nightingale: "It is a fact, demonstrated by statistics, that in the improved tenement dwellings the mortality has fallen off from twenty-five to sixteen per one thousand."

Says Mr. Edwin Chadwick: "In old dwellings, the death rate has been reduced, from fluctuations of from thirty to forty per one thousand to fluctuations of from thirteen to twenty and thirteen to fifteen per one thousand. In particular districts the death-rate has been reduced one-third, that is to say, it has been made as if each third year was a jubilee, and no deaths, and no sickness. I have an instance where, in an agricultural district, and with laborers alone by care, the death-rate has been reduced one-half." While we leave to the physician individual cases, it is surely the care of the State to ward off physical evil when the methods are palpable, and when it can only be done by extended regulation.

In England property owners are becoming each year better educated as to the importance of good tenements and of sanitary regulations, not only as contributing to the welfare of the occupants of their houses, but as a means of securing good tenants and prompt payments. It is found wherever a system of inspection and disinfection is kept up there is a steady decrease in the rate of tenement house mortality. "Our own immunity from disease cannot be secured without looking after the safety of our less prosperous neighbors," and interest combines with philanthropy to make us concerned for them.

#### CARE OF ARTS AND TRADES, ETC.

In connection with various trades and occupations, there are conditions tending to uncleanness, or deleterious dust or gases resulting, which must need have the most careful inquiry of sanitary

legislation. The gas nuisance, for instance, in New York city, was found to be not only so unpleasant but so loaded with vapors unfriendly to health that, upon a large amount of accumulated evidence, the board of health secured modifications and improvements.

The result of their investigations did not, except in one instance, require forcible action, for it resulted, as the inquiring of sanitary law so often does, in convincing the corporation of the need of change, and opened feasible methods of preventing the nuisance.

Factories of various kinds must, in the process of manufacturing, give off noxious vapors, but with the arrangements now known to science for disposing of these gases and consuming the smoke, there is little excuse for offending the nostrils, and still less for endangering health. "All vapors," says the New York Health Report, "even from the boiling cauldrons in which offal is boiled, can be condensed by methods now well understood and no offensive odors permitted to escape." There is no reason why malodorous factories, driven from New York, should locate in New Jersey, and there have long litigation in order to show that bad smells are not unhealthy.

Even the refuse from factories can in most cases either be utilized or its heaps so dealt with as not to be injurious.

Lime burning, soap making, tanning, and various other operations, can be conducted with safety to the workman and to the protection of society from foul odors.

Prof. Tyndall has published a lecture on "Dust and Disease," and it is more and more apparent how much evil results from the inhalation of noxious vapors or organic material into the lung. Very often where no smell is perceived great injury is done. In various workshops and factories the dust is injurious, and modes of getting rid of it should be looked after. The power of imperceptible inhalation is illustrated by the case of children dying in London from the arsenic contained in the paper on the walls of the room, and analogous cases abound in medical records. (See Mass. Report, 1872, p. 38.)

Is not the proposition of Simon, the chief medical authority of England, correct as to the sanitary rights of the working classes, "that whatever work their employer assembles them to do shall, so far as depends upon him, be at his cost divested of all needless unwholesome circumstances."

We are familiar with evils accruing from their business to millers, tailors, miners, shoemakers, painters, etc., and Max Muller, in reading a health report as to bakers, said that he felt as if he had been consuming at the rate of "one baker a year in solution."

It is to our interest to get comfort and joy and health in the laborer as well as work from him. It is well said, by a lady in the Mass. Report of 1873, that "it is extremely important that every person should be advised to what extent, if at all, his occupation is prejudicial to health, and have such perfect understanding of its dangers



and the means of escaping them, that he may not, through ignorance, find his pecuniary success early supplemented by his physical wreck."

Several cases of poisoning to laborers occurred at Orange, in our own State, but these marked cases that attract attention are but a minimum in proportion to the thousands suffering from every day errors. Dr. Coleman, of Trenton, in reference to the matter, well says: "In almost every establishment where men are congregated ventilation is neglected, machinery is not properly fenced or guarded to prevent accidents, the proper degree of heat is not attended to, and deleterious material used in the arts are not carefully managed, when science and attention would make them comparatively harmless. To secure these ends, a careful examination should be made of all manufactories, where gases, vapors or effluvia of a noxious character are evolved; of establishments where poisonous chemicals are used in the process of art; of rooms where many are crowded to work at some branch of business that requires but little muscular exertion, and, as a consequence, making the need for fresh air less recognized; of schools, the worst of all places for undermining the health of the young, if not carefully warmed and thoroughly ventilated; of popular churches with large congregations, where each individual must remain for a time exposed to an unusual temperature and atmosphere, and also of districts of country and localities, where malaria is known to prevail. These investigations, made by competent persons, would show conclusively that a great amount of sickness and death could be prevented, if a little intelligent humanity were exercised by proprietors or those having these matters in charge."

The necessity for this is so obvious that these brief references are sufficient. It is for a wise legislation to work it to a proper conclusion.

A good illustration of the benefits resulting from changes which a regard for public health and comfort initiates, is the abattoir system, which, although long in vogue in some parts of Europe, has only been recently adopted in this country. In Paris, where the system has longest been in operation, there is inspection and care of the animals beforehand, as well as such a conducting of the whole process of slaughtering, rendering and disposal of every part as shall be both healthful and profitable, and it is of value to the trade as well as to the public health.

Tardieu, a French author, familiar with all these arrangements, says: "The establishment of communal and public abattoirs is of capital importance as regards the butchers' trade."

It is pleasant to know that Boston and New York have both succeeded in giving popularity to the system after determined opposition.

Sanitary science and sanitary reforms have fairly fought the thing

to conviction. We heard Dr. Bowditch, of Boston, recently say that the leading butcher of Boston, who had been the great opposer of the system, was now its most enthusiastic defender, and himself a model in his exactness in carrying out its details.

The time will come, when, on the score of health, the slaughtering of animals, within or near city limits, on any other plan, will be considered an outrage.

The last Philadelphia report says: "The present objectionable establishments for fat melting, bone boiling, as well as for slaughtering, should be concentrated at abattoirs, where every part of the animal can be utilized." Time and space only prohibit further illustrations to be drawn from various industries, to show how economically practicable, as well as conducive to health, would be the more general application of well known principles of sanitary science to various arts. In such cities as Jersey City, Newark, Trenton, Paterson, Camden, and others destined to invite large manufacturing interests, it is of great importance that the welfare and comfort of the artisan, and the relation of the business to the health of community be well understood.

#### VENTILATION.

The importance of proper ventilation, or of pure air, is another of the subjects which, having greatly to do with the welfare of citizens, and the prevention of disease, should attract governmental attention. If asked upon which health most depends, right air or right food, the answer would give greater importance to the former, as having the most to do with well sustained vitality.

We have little control over the outer air, except not to pour into it more than is necessary of those gases or organic matters deleterious to human life. But the conditions of life are such that we need houses to dwell in, and as population becomes more advanced, these are reared with little regard to health, and are crowded together in compact cities, and numbers crowded into them.

In connection, too, with our modes of living, and the necessities of various indoor preparations, addition is made to noxious vapors, and hence there are many sources of indoor contamination which do not exist in the open air.

Each person is also expiring constantly from the lungs an amount of carbonic acid and organic matter, and impure watery vapor, sufficient to rapidly render the air of a room unbearable. There are other sources of foul air, such as fires, lamps, et cetera, besides such as decompositions produce, so that the whole subject becomes a most important study. This, all the more, because each year is demonstrating the connection between foul air and disease, and showing how many ailments, once regarded as unavoidable, are simply foul air diseases. A single person will use about ten cubic

feet of pure air per minute, or six hundred cubic feet per hour, and when we add to this the demands made by other infused impurities, it is easy to see what need there is for large air space, or for some method by which in smaller spaces frequent air change is promoted. This is all the more needed where filth or sickness add more organic material, and cause fouler and more rapid decomposition. "The fact must be borne in mind that the worshippers in chapels, the audiences in concert rooms and theaters, the thousands of children that throng our public schools, and the multitude of persons who crowd our railway carriages, are utterly dependent upon the public authorities to regulate such matters.

Says Prof. Kedzie, of Michigan: "I consider the proper warming and ventilation of our school rooms as prime necessities for the success of our common school system." Shivering and over-heat alternating, amid foul air, incapacitate children for mental effort. Sending a child to a school house, does not always mean giving the "advantages of education."

Often in crowded places it is not enough that windows are open, for no breath of air is stirring, and there is no chance for circulation of air.

A bedroom, for instance, with four or five sleepers in it, may be so situated in reference to surrounding rooms, or the outer air may be so stagnant or heavy that it will show itself loaded with  $\text{CO}_2$ , even though there is an opening to the outer air. Nor does foul air depend alone upon this, for the animal matter given off by lungs and skin, tends to rapid decomposition.

This is the source of that sickening odor familiar to most physicians, and it is far more deleterious to health than the carbonic acid gas alone. Each person excretes indoors not less than six pounds of animal matter per month from the lungs and skin, allowing twelve hours in all to be spent within.

In 1869 the New York Board of Health examined the air of nearly all the theaters, and many of the schools, court rooms, churches and halls in the district.

An amount of carbonic acid gas was found, in many instances rendering the air very detrimental to the health of the occupants. The organic material consisted in large part of the street dust, rendered volatile, and fully fifty per cent. of this dust proved to be the fecal matter of horses. It was also found that the temperature of these public places was excessive, ranging often as high as  $90^{\circ}\text{F}$ ."

Prof. Huxley does not seem very extravagant, when, in a city address, he said the "ordinary air is no better than a sort of stir-about of excessively minute solid particles."

The indoor habits of the American people, their modes of living, and fondness for close heated rooms, is an evil which every sani-

tarian feels to be a most prolific source of disease and physical degradation.

It is high time for us to turn general attention to the greatness of these errors, and that our authorities should indicate the line of direction in which remedy is to be sought. All our plans of disinfection and cleanliness will fail, unless purification and health elevation, by proper æration, is kept as the central idea of success. While the diffusion of gases, wind, rain and temperature do much for the circulation of air, yet our dwelling houses and our cities are interposing obstacles, which must be counterbalanced by knowledge and by wise provision.

#### HEATING.

Connected with ventilation, and as a subject coming prominently under the investigations of preventive hygiene, our methods of heating have a very important bearing on health.

Brown Séquard, when asked why the American people show such imperfect nerve tenacity, replied, "one chief cause arises from your abominable hot houses."

"I am convinced," says Dr. H. R. Stiles, "that the health of a very large number of our business men is being slowly but surely undermined by defects of ventilation, heating, light, etc." Most, even, of our legislative halls are improperly heated and ventilated, and it is well known that long life is not promoted by the apartments to which most of our legislatures are subjected.

"A temperature of 54° F. is the medium temperature of the air best adapted to the public health, for at this temperature the decomposition of animal and vegetable matter is slight, and the normal temperature of the human system is most easily maintained. This of course would be too cool for constant sitting, and yet, the excess so generally indulged in, is by far too great, besides, those irregularities of temperature and of air which are injurious and avoidable.

#### OUR FOODS.

As so much of health depends upon proper foods, it is another proper care of the State to see that its citizens are protected from public ill in this regard. "The health and power of a nation," says the lamented Derby, "as of an army, depend greatly upon its food." In our larger cities there is need, not only of supervision as to the slaughtering of animals, but that fish, vegetables, and fruits, both foreign and domestic, should have competent inspectors. Markets should be kept scrupulously clean, so that decaying matter of any kind should not be found in the vicinity to taint that which is fresh and good. Milk and cheese, which form so large a part of

the food of a large class of population, need also protection from contamination. Where, as in Washington and some other cities, careful market inspection has been conducted, it is surprising how much of various articles is found in a condition unfit for use, which otherwise is sold, or if meat or fish, put in pickle after putrefaction has commenced.

In the year 1869, the chemist of the New York Board of Health examined seventy-nine specimens of kerosene, obtained at various groceries, and found seventy-eight mixed, and some of them excessively dangerous.

Gas is often impure, so that our lights, as well as our foods, need guarding. We have already alluded to the impurities of water. The various forms of liquor need examination as to adulteration, as also various other fluids used for drink. Few of the soda syrups, for instance, are made from fruits, and some them are positively injurious. Our confectionery, occasionally, also suffers from unhealthy colorings. Suffice it to say, that in all these, and many other regards, the experience of health boards, both here and abroad, has shown that surveillance is the only method of preventing untold impostures. If it is a part of government to appoint appraisers and examiners of weights and measures; we still more need to be protected from that worse imposition to which we are subjected when the article sold is itself a fraud, deeper than the pocket, and reaching to health and life. It is wonderful how much a little legislation, and an imparting of information, through civil authority, can do to protect the people from manifold sources of disease, which will otherwise accrue from these and like sources. Talk as we may about the impossibility of regulating foods, or reforming the domestic methods of the masses, it nevertheless has been the testimony of house to house visitors and inspectors, that the poorer classes suffer as much from ignorance of the results of wrong food, wrong cooking, wrong living, as they do from disregard. Frequently where the law comes to their aid, they are awakened to the benefits of reform, and increasing cooperation is apparent.

Shop-keepers are thus deterred from adulterated goods, and the public health protected.

#### VITAL STATISTICS.

We have thus alluded to a few of the various subjects having a bearing on the prevention of disease, which may well elicit the attention of those whose care is the welfare of the citizen. These are but specimens, not discussed in detail of the large field already open to sanitary preventive science and legislation.

In order too, that we may more accurately locate and compare the causes of diseases, we must know where, and under what circumstances, diseases exist most, and what are the atmospheric and



telluric conditions which modify them. Besides, as having a bearing on the laws of population, statistics as to births and marriages are important. So decided is the bearing of such facts in determining laws of health, that most countries and States have recognized the importance of collecting what are thus known as vital statistics or records of births, marriages and deaths, and the causes and circumstances of death.

The value of statistics in general is so far recognized that now no country of importance omits a census. This is not merely a matter of curiosity as to increase or encourage patriotic vanity, but government has special superintendents of census, whose business it is to classify and arrange, and elicit facts, and so to study them as to give aid in the various industries, and as showing the relations of capital and labor, of production and consumption. So important are all these that some States and cities are not satisfied with decennial estimates, but institute intermediate inquiries.

Questions as to increase of population, or as to the loss of life, of longevity, of death, are so imminently identified with all these that vital statistics have been given prominent consideration in Great Britain and other European countries. Massachusetts has had its system of registration, with some improvements, for thirty-one years. Rhode Island has a finely perfected system of tabulation, and other States have, more or less, success in the same direction.

This seems to have been one of the first attempts in our own State toward a recognition of the fact that the conditions of citizens, as to life and health and increase, is legislative concern.

Hence, for long years we have had a system of vital statistics, conducted at an expense quite sufficient to give some results instructive as to health matters. Yet the medical profession of the State, whose judgment as to their accuracy ought to be of some value, never refer to them except as an example of their inaccuracy.

This is not a fault of the official superintendence, but of the method, and of a failure to apply the systems of tabulation and arrangement which statisticians now recognize as most valuable.

Deaths, and the causes and surroundings of death, are full of information in a sanitary point of view, often pointing to local causes of mortality, and giving us lines of direction as to its abatement.

So uniform is the law in cities, that a sudden increase in any locality often leads to immediate visitation in order to control the cause. Even in chronic diseases we find them in the same State very differently distributed in different localities, and gain instructive facts as to causes and methods of abatement.

In our own State, with the exception of Newark and lately of Paterson, we have no such statistics that are reliable as guides. For instance, the death rate of Newark, which about accords with the usual proportion of several cities, is about thirty-one to the thousand, while the statistics of Jersey City, for 1871, report sixty-

six deaths to the thousand, and Elizabeth ~~sixty-two~~. These latter are well termed by an eminent statist of another State, merely "conspicuous and absurd examples of imperfect registry and fictitious death rates."

Statistics, unless quite approaching accuracy, are worthless, as are those of our own State registry in this regard, but if accurate and carefully collected and compared, they are full of instruction to population, and as to the tax on vital strength and so on the material force, made by invalidism and death.

Says a British author: "One of the first great objects of sanitary organization should be to watch the death-rate; to watch it not only over a city or parish, but in detail; to watch it with due regard to difference of sex, age and circumstances; to watch it from month to month, and even from week to week; to watch it as affected by different diseases, and particularly what are termed epidemic diseases, and such diseases as we believe to be in a great degree preventable; and this done, to make known the result from time to time to those who are chiefly concerned in sanitary evils and their removal, so as effectually to bring home to the dwellers in darkness, ignorance and disease, the immense significance of the facts taught by these figures."

Dr. Elisha Harris, the distinguished statist of New York city, says: "The total gain in the number of lives saved from the grave, as shown by statistics, shows only a fraction of the actual gain to the value and usefulness of the aggregate of life, because the gain to the common stock of healthy and vigorous in a population is twenty fold greater than the few added years of worldly comfort and usefulness that are represented by the number of persons at different ages, saved from premature death." Nor on the other hand does an excessive death-loss tell the whole of the story in the other direction. The number of deaths is but one index finger as to the mischief of disease. "It is not," says Lord Stanley, "merely by the crowded hospitals, the frequent funerals, the destitution of families, the increased pressure of public burthen, that you may test the sufferings of a nation over which sickness has passed. The real and lasting injury lies in the deterioration of race, in the seeds of disease, transmitted to future generations, in the degeneracy and decay which ensues."

It is only by the careful collection of statistics as to death, its causes, and the ages and locality, and circumstances that we get on the track of sickness and its causes, while births and marriages also have their bearing on great questions of population, which political economists from Malthus to Mill, have not omitted to discuss. Our State is one greatly favorable to investigations in these regards, and your commission believe that with more accurate returns, and more modern tabulation of information obtained, great benefit would accrue.

The lines and phenomena of disease, the causes of its prevalence in some localities, and the reasons for exemption in others, would become apparent, and so we would be directed to the methods best adopted to forestall and prevent undue sickness and mortality.

#### SANITARY RELATIONS OF ANIMALS.

The health and condition of domestic animals is so related to that of man, that their diseases have always come under the consideration of sanitarians.

Close relations, traceable between epizootic and epidemic diseases, and besides the bearing of the milk and flesh condition of animals on food and health, make it a subject of prominent importance. Sir James Simpson, Playfair, Sir Thomas Watson, Madden, Farr, Harris, and others, have given large attention thereto. Pleuro-pneumonia, the foot and mouth disease, the cattle plague, the Texas fever, and the diseases of sheep, horses and domestic fowls, make up a most important division of sanitary study.

“In some continental countries the human physicians are obliged to study the diseases incidental to the lower animals, and to treat them if they afterwards practice in rural districts.”

The public seem little aware what investigations have been made, and what accumulations of facts are in possession of science. Even the treatment is far more definite and successful than is generally imagined.

Questions of stable ventilation, of food and of management are shown to have great relations to diseases, and where an epidemic influence prevails. This is to be overcome or mitigated by very many of the same class of procedures that avail in relation to human diseases. For instance, of the Rinderpest, or cattle plague, Dr. Lankester says: “The poison of cattle plague is as distinct an entity as an oak tree or a man, and can be no more spontaneously originated than the highest organisms.” Yet, we are all aware how much its limitation depends upon the removal of those anti-hygienic conditions which favor its progress. In almost all diseases of animals there are those who, without any proper knowledge, deem themselves prepared to treat them, and manifold remedies, from salt mackerel to soft soap and urine, bear a part in their treatment.

An animal, when sick, is quite as liable to suffer at the hands of its experimenters as from the disease. There is need that this whole subject be committed to the investigation of skilled and experienced sanitarians, and that general and yet reliable information be spread among our population as to the cause, limitation and treatment of these diseases.

The welfare of the animal is a matter of great interest, in economical as well as humanitarian aspects, and our general government is wisely making inquiries, and statistics as to it a subject of attention.

The disease of horses, sheep and domestic fowls, are scarcely less important than those of horned cattle, and it becomes a wise commonwealth to instruct its people in all these regards. An amount of definite information as to such matters is already in the hands of your commissioners, such as has important bearing upon the prevention and cure of animal disease.

The whole subject naturally comes within the purview of a health board, and may very properly be assigned as one of the subjects for exact inquiry and proper information.

It has thus been our endeavor, in this report to your Excellency, to make apparent the relation which health and life bear to public prosperity; to show, by specifying some particular diseases, how much more extensive the field of prevention is than is generally recognized; and to refer to some of the most potent and wide-spread causes of disease, and neglect of methods which entail upon our citizens great excesses of invalidism and mortality.

We have also shown, by the testimony of manifold observers, and by the actual experience of various governmental authorities, how far such matters have been recognized as within the jurisdiction of the State or commonwealth, and how satisfactory have been the results secured from an application to these principles.

A careful examination of the only health records available in our own State, and a knowledge of the topography of the State of its exposures, and extended acquaintance with those who are the conservators of the public health, leave us in no doubt that these health interests are as vital and important to us as to other States. The same classes and sources of evil exist in our dense cities, in our villages, in our rural districts.

Information should be spread among the people, and various evils abated as fast as popular sentiment responds to a sense of the need, and law should come to the aid of enlightened public opinion.

In order that your Commission might inform themselves more definitely of the opinions of sanitary observers through the State, just at the present time, we, in June, issued the following circular:

#### CIRCULAR.

The Legislature of New Jersey at its last session, appointed a Commission to inquire into the present sanitary condition of this State. We ask your kind co-operation in an attempt to secure such information as will enable us to judge of our chief sanitary needs. You are desired to communicate with any of us as to any defect in existing laws, or as to any sources of disease recognized in your vicinity. The following are among the points to which we would call your attention:

What are the prevailing diseases in your locality?

- What local causes of disease do you detect?  
 Have you any miasmatic diseases?  
 Is the drainage good or defective?  
 How are sewerage, garbage and out houses cared for?  
 What is the usual method of house water-closets?  
 What is your source of water supply?  
 Has it ever been tested?  
 To what extent are well and cistern water used?  
 What modes of heating houses most prevail?  
 How are most of your public buildings ventilated?  
 What is the usual air space in schools and factories?  
 Are cellars and basements cleansed and aired?  
 Is vaccination prevalent?  
 Should your town or township have a Board of Health?  
 Has your city a Board of Health?  
 If you have a Board of Health, state its defects in power, or in the exercise of it?  
 If a city, have you any hospital or dispensary?  
 How are paupers provided for?  
 What trades or occupations are injuring the health of operatives?  
 Have you manufactories of which the odor or refuse is a nuisance?  
 Is the slaughtering of animals conducted so as not to be injurious to health?  
 Have you any public baths?  
 Have you a system of vital statistics?  
 Is certificate of cause of death required in case of burial within the State?  
 What modes of disinfection are most in use?  
 Where is garbage dumped?  
 What diseases of animals have prevailed in your vicinity?  
 Give symptoms and treatment?  
 What suggestions can you make as to the best method of securing sanitary improvement?  
 The Commission will be glad to receive from all citizens, whether physicians or laity, any communications relating to the health interests of the people.

(Signed),

JAMES R. MERCEIN, Jersey City,  
 SAMUEL LILLY, Lambertville,  
 GEORGE H. COOK, New Brunswick,  
 WILLIAM ELMER, JR., Trenton,  
 LEWIS W. OAKLEY, Elizabeth,  
 RICHARD M. COOPER, Camden,

*Chairman*, EZRA M. HUNT, Metuchen.

A sufficient number of responses have come to us from various parts of the State, and from the most intelligent in their acquaintance with public hygiene, to confirm our views of the important necessity of extended sanitary knowledge and legislation.



They uniformly recognize the necessity of more attention to the interests of public health, and the wide scope there is for an improvement of the physical condition of the people.

We herewith give extracts from some of these, as showing how far these needs are recognized.

We have from the member of the commission from the district of which Elizabeth is the centre, a report as to his own immediate section. The drainage of Elizabeth, as a system, is said to be good. "The only defect in our plan of sewerage is the fact that a tidal creek running through a part of the city is made the outlet to the sewers of the northern and western parts of it; and while no directly traceable ill-effect is yet noticed, there is room to fear that ultimately this may prove a source of disease. Here, as elsewhere, the subject of utilization of sewer contents is an important matter for the consideration of the practical sanitarian.

"House water-closets are very generally used in all the new buildings, and in not a few of the older ones. A pretty close observation throughout our own city, and reliable information from other localities, convince me that the careless and imperfect manner of their construction, and of the house sewers connected with them, is the frequent cause of very much serious and fatal disease.

"I am satisfied there is no one subject which requires more personal investigation into individual cases than this.

"It is a matter which involves the health and life of the wealthy more than the poor,—those who live in the 'mausion,' rather than those in the tenement house."

Objection is made to wells in cities, as they must necessarily receive more or less of the drainage of surface and privies. "Wells are used, to a certain extent, with us, but the sinking of iron tube until a suitable vein of water is struck is very generally taking the place of the former, where the city water is not introduced. The latter plan does away with many objections to the old well."

There is a Board of Health in Elizabeth city, but the view is expressed that some uniform provision for the county would be desirable. The report further says:

"As to manufactories, of which the odor or refuse is a nuisance, I would especially call the attention of the commission to the localities on the water front of Newark Bay, and of an establishment for the manufacture of fertilizing materials from the refuse of slaughter houses, and of animal matter from the streets of New York. They are generally located beyond the limits of cities, where they might be controlled by the authorities, and the county has little or no power to abate such nuisances. They may and do become, not only exceedingly offensive, but positively injurious to the health of the inhabitants of a large district about them. Some general law should be enacted empowering the freeholders to enter upon such premises and summarily abate such nuisance."

The report also notices the fact that, outside the city limits no certificates of death are required, and no system of vital statistics obtained.

The excellent paper of a county superintendent of one of the counties in Dr. Oakley's district, on the ventilation of school houses, is herewith appended.

"The importance of the thorough ventilation of school-rooms seems to have been well nigh overlooked. Indeed, with rare exceptions, the only provision made for that purpose is by means of the doors and windows. Of all rooms, those in which the youth assemble daily, to be educated, should be rendered pleasant, attractive and healthful. Yet very little attention is given to the matter.

"The number of school-houses in the county is thirty-five (35), valued at three hundred and eleven thousand two hundred and fifty dollars (\$311,250). The number of school-rooms is one hundred and thirty-eight. Some of these buildings have been recently erected; yet, with three exceptions, little or no attempt has been made to ventilate them. Efforts have been made repeatedly to lead the people to insist upon having provisions made for the ingress of pure air, the escape of the impure, and the establishment of a gentle, yet thorough circulation of the air in each room upon scientific principles; but trustees, architects, and builders have failed to recognize its importance. I do not believe there is a perfectly ventilated school building in the county. Approximations toward it have, however, been made in five instances. In those, while provisions has been made, either for the admission of pure air, or the escape of the rarefied air, provision has not been properly made for both, nor is there any suitable means provided for the escape of the carbonic acid; in consequence of which there is no circulation of the atmosphere, unless windows are opened, and in that case a current of cold air passes across a portion of the room, endangering the health of both teacher and pupil.

"Again, in many of our school-rooms, especially in the rural districts, the height of the ceiling above the floor is only from nine to eleven feet, whereas it should be at least fourteen feet. In a room 16x24 we often find forty pupils. The number of cubic feet of air in such cases allowed each pupil is only a little over one hundred and three (103). The evil effects of confining that number of pupils in such a room for five or six hours a day, must be apparent to every one. I would not be understood to say that all our school-rooms are of this class. On the contrary, we have very many fine rooms in various parts of the county, while very few are even tolerably ventilated.

"It is very gratifying, under these circumstances, to know that you, together with a few other public-spirited men, have taken this matter in hand. Be assured that your efforts are appreciated by

teachers and pupils. Recognizing you as friends, using your time and influence in our behalf, and in the interest of the youth attending our schools, we are grateful. As teachers, we shall gladly remember and heartily aid, little though that may be, in the good work.

In closing, permit me to add that I do not believe we are one whit behind other counties in the State in the ventilation or value of our school buildings. Indeed, I know we are in advance of many. Ventilation of school rooms and public buildings has generally gone by default in nearly all parts of the State."

Communication from Rahway states that there are still local causes of miasmatic disease and defective drainage.

"The usual method of house water-closets is sinks or wells.

The water comes from cisterns and wells entirely. The city water works are supplied from wells.

The water has not been tested.

The city has a Board of Health, but the indifference of its members amounts to inefficiency, and we have no hospital or dispensary.

There is no system of vital statistics, and no certificate of death is required, when the burial is within the State.

Garbage is dumped on vacant lots. We should have a Board of Health, chosen on account of their fitness and knowledge of the laws of health, their general intelligence, and their interest in the subject of hygiene, (and not, as now, a Board composed of men who drop into it because of their election to some other office,) would be the best way to secure the city against many evils."

A report from Springfield says: In summer fevers present themselves, at first mild and almost invariably "intermittent, but become more grave as summer advances, and we have in succession remittent, or sometimes typhoid-remittent."

This is manifest in all diseases, and is common in the entire surrounding country, until you have gone some fifteen miles westward.

In consequence of mountains on the west, a large body of water must be thrown on the level, and the fall from here being inconsiderable, must contribute largely to the amount of moisture in the atmosphere. This probably might, in a considerable degree, be relieved, by removing obstacles from the water courses.

These obstacles consist in accumulations and in dams raised for manufacturing purposes. These are certainly susceptible of improvement. The Rahway might be improved, and its tributary, called Van Winkle's brook, another smaller stream, should be straightened and freed from the debris which obstructs the flow of the water.

The laboring classes occupy small houses. Such people have seldom any idea of sanitary law, and the effects of its violation is

sometimes seen in the cause of the disease by which they may be affected. Unfortunately there is no authority under which these evils can be successfully met, the influence of public opinion is quite inoperative.

Our poor are provided for on the principle of selling them to the lowest bidder.

As to the effect of occupation, the hat factories are those which principally affect the health of operatives.

Severe mercenrialization is of frequent occurrence among them. In some of the paper-mills rheumatism has resulted from long continuance in the excessively damp atmosphere of some of the apartments.

Certificates of death are not required, unless the body is removed to cemeteries whose regulations call for them.

Among animals pleuro-pneumonia has been quite prevalent, particularly in Union township.

The report from Plainfield and vicinity says: "Sewerage and garbage, and out houses, are not as yet systematically cared for, and we fear endemic disease may be the result, sooner or later, of neglect to have the matter rigidly looked after.

"The drainage from house water-closets is conveyed to the cess-pool, the liquids from the kitchen are taken, in many instances, only a few feet from the house.

"Our source of water supply is by wells, and the matter of having city water works has been agitated, but as yet has resulted in nothing save the granting of a charter from our State Legislature for the formation of a company. We deem this matter of water supply, together with a more thorough sewerage, to be very necessary, both as regards safety to property, and the health of our inhabitants.

"Our city has a Board of Health, but as yet has made but little effort toward the systematic and thorough looking after those matters, which, in my opinion, should be the duty of a sanitary board.

"We have no system of vital statistics. Certificate of cause of death is required by Board of Health. I believe the appointment of this Commission by our State Legislature to be a move in the right direction."

A correspondent from Scotch Plains says: "Most houses have a dug well and cisterns. Some houses have driven wells, which I think are unhealthy, on account of the galvanized pipes and brass cylinders or screws used."

A report from Orange, says: "Orange has been remarkably exempt from malaria, in part by care. But within the last six years farms have been purchased by speculators in land, which have been laid out in streets and built over. These farms have more or less low ground, which has been filled up from two to four

feet and built upon; the consequence is that the cellars are wet, and their drainage imperfect. Here we find more or less miasmatic disease.

"We have no sewerage. Cesspools receive the waste from the houses. Our surface soil is light and absorbent, the sub-soil over the most of the town is a sandy loam, which soon becomes coated in the cesspools, rendering it necessary to empty them more or less frequently. They are usually emptied upon the surface, in the gardens and on the lawns. I have never observed any evil results from this, except in cases where they are allowed by neglect to overflow, and thereby to vitiate the air in their vicinity. I have met with dysentery and scarlet fever attributable to this poisonous influence. These cesspools, together with neglected outhouses, need to be carefully watched by our authorities, and their evils abated. Garbage is not allowed to collect. It is gathered up twice a week, during the summer, and carried to a proper receptacle. No low grounds are being filled up and reclaimed by it.

Our water supply is by wells and cisterns. The red sandstone is our substrata rock. Some of the wells are impregnated with iron—none with any great degree of lime.

We have a Board of Health sufficient in its powers to protect and promote the good sanitary condition of our town.

To perfect our sanitary arrangements, we need:

First—To get rid of our cesspools in the more densely settled parts of the town; and

Second—A more perfect adjustment of the plumbing and water-closet apparatus in our better class of houses.

I lost a patient last year, I have no doubt, from the poison of a water closet in one of our fine houses. I believe that they are in many houses promotive of serious disease.

Those seeking houses in the country regard a bath room and a water closet as a *sine qua non*, but it is too often the case that there is sickness and often death in them.

Orange has a Board of Health.

The city of Paterson has an energetic Health Physician and a Board of Health, with a Bureau for sanitary inspection and vital statistics. Next to Newark, it is, we should think, the best organized for work of any in the State.

The reporter says: "The power by the terms of the city charter is ample;" but, practically, its power and the performance of its duties has been very limited.

The defect in power arises from the fact that no sufficient authority has been conferred on it by ordinances of the Board of Aldermen, and in the performance of its duty it is hindered, from the too frequent change (yearly) in the members of the Board, and the inability of the executive officer to give much attention to the work. The Bureau of Vital Statistics has been in operation for the



past two years, and is particular and efficient in all matters belonging to its jurisdiction.

There are sewers in most of the important streets, but very many are still unsewered, and where they do exist very many houses have not yet been connected with them.

A majority of the houses have still the old fashioned privy or cesspit, which is often a source of disease and discomfort. The privies are cleaned out by buckets, in the old style. The garbage is collected by city carts, twice a week in summer and once a week in winter. It is mixed with ashes and dumped wherever a suitable place can be found, often to fill in streets and low ground, where it can be done without offence."

The street cleanings are disposed of in the same manner.

Neither of these are done as frequently as is desirable for the health of the city. Only a small portion of the streets of the city are either paved or macadamized, and it is almost impossible to keep them clean.

There are a few manufactories, the odor of which is a nuisance. The slaughtering of animals is not properly conducted, and the Board of Health have now under consideration an establishment which is a nuisance to a large neighborhood. Vaccination, two years since, was performed by house to house visitation, with excellent preventive results.

In the suburbs of this city and along the river, we have a considerable amount of malarial fevers. Some years ago we had almost an epidemic of typhoid fever, but there has been little since.

A report from Newton refers to the existence of autumnal fevers, which are generally typho-malarial, and generally defy investigation as to cause. For instance, this summer, in one family four were attacked and four escaped. I found all the drains and cellars, and the neighborhood, (houses all around) in order. The four attacked were great water drinkers, the rest were not. But the well did not reveal anything when cleansed.

Its water had been clear and revealed no presence of ammonia, on applying Nessler's solution, though it would discolor a good deal of permanganate of potash solution. This, however, would not be conclusive of animal matter.

Those of the family who suffered were just the four water drinkers, and I think that was the cause. The natural drainage of the ground was from privy toward well.

I have observed, for several years, that in whatever quarter of our town much earth is upturned in building, intermittent, remittent fevers and miasmatic dysentery will prevail for one season. The winter's frost puts an end to it. We have, in dry seasons, seen intermittents very prevalent along the shrunken water courses, and particularly where the stream is sluggish and the banks either marshy or muddy from salt brought down.

Our natural slopes to a great degree cure the evils which would otherwise result from defective drainage. Our typhoids have been most prevalent in a part of the town where two slopes meet and make a valley, with little fall, and especially where a slaughter house is drained into it.

"Most privies are holes in the retentive clay grounds. Some drain slowly into a little stream, others are over that stream which runs covered through the town. They are in some parts offensive at night. Where people keep pigs or cows, the garbage is thrown upon the manure heaps, which are abundantly scattered through our thickly settled village, and are manifest to the nose at night. Were it not that our town is so situated that every rain washes us out, we would be very subject to disease.

"Ventilation is spoken of as defective. One church, for the sake of economy, sends the vitiated air back to be reheated. We have but one factory, which, at a guess, has about five hundred feet to an operative in the most crowded rooms. Our schools have less than four hundred feet of air space to each child.

"In winter cellars are seldom opened. I have seen a whole family taken down with typhoid from this cause. A disagreeable gas house is here, as in many towns, a nuisance. Our streets are often made filthy by garbage.

"The chief evil to animals was the epizootic, two years ago. Sometimes, I believe, the dairies are afflicted in the spring by abortions, as I think due to bad ventilation of stables.

"In suggesting the best method of securing sanitary improvement, I would recommend a Board of Health, after the plan of a former sanitary commission. It should be the duty of every Board of Health to investigate every case of fever, and to seek all the circumstances where measles or scarlet fever, or erysipelas take their rise. No burial should be permitted without a certificate. No case of abortion but should be reported, under penalty, to the Board of Health. Every birth should be registered."

As to Trenton, we have replies to the circular from the President of the Board of Health, the Superintendent of Schools, and others, both medical and lay sanitarians.

Rheumatism, malarial fever, and consumption, are spoken of as prominent diseases. We have "a damp soil, and an atmosphere saturated with moisture."

"Delaware river runs along one side of the city, the Assanpink creek, the Delaware and Raritan Canal and its feeder, and a long stretch of an artificial water power, make their way through it in various directions. Petty's run, after being obstructed at several points, finds its way into the water power, and it, as well as the water power, are used as open sewers, and for the disposal of garbage, to an extent that is neither decent or healthful.

"Garbage, in some parts of the city, is fed to pigs on the premises

"From the more thickly settled parts, it is taken away by swill women, in baskets and wheelbarrows. The solid contents of privy vaults are removed at long intervals, and the liquid portions soak into the soil.

"The water supply is good, except some little organic matter is found in it. Vaccination is much neglected.

"Trenton has a Board of Health, but it has no money, and has held no meetings for a long time."

Another correspondent says: "'In the Swamp,' so called, a district, lying between the feeder and main canal of the Delaware and Raritan Canal Company, Greene and Jersey streets, through which at one time a running stream of water passed, the head of which is diverted in another direction, and its outlet obstructed," is a local cause of disease.

The surface water of a large district is drained into the old bed of the stream. Out-houses are located on it, garbage and offal are thrown into it, making it a hot bed of disease—in the midst of, perhaps, the most populous and over crowded portion of the city.

"Drainage, very defective; sewerage, we have none." Garbage is often thrown into back alleys, or on rear of lots, to take care of itself—sometimes, at night, thrown into the streets. "Out houses are cleaned sometimes." Another report speaks of the natural drainage as good. All reports agree that house-water closets are drained into house-wells or cesspools in the ground near the building.

"The best sanitary improvement would be a complete system of sewerage, by which not only surface water, but all offal matter, which can be drained should be carried beyond city limits, and the employment of carts to take away all other garbage which accumulated in every house before it is allowed to putrify or poison the air of a whole neighborhood.

A member of council says: "We have a Board of Health composed of sixteen members. It is called together when demanded by the existence of a nuisance calculated to endanger public health, or to devise means to prevent the spread of contagious diseases. Its powers are not what they ought to be.

The ventilation of schools and all public buildings, is spoken of by the Superintendent of Schools, and by others, as very defective. "No forced ventilation is used." The question, what is the usual air space in schools and factories is answered: "Nothing for respiration; all for work." There is no system of vital statistics or record as to the cause of death. A correspondent from Princeton says: "Our most important problem just now is how best to manage the water-closet business. It is only a partial success at present."

Another says: "No miasmatic diseases in Princeton—they prevail, to some extent, in the country along the canal, Stony Brook, and the Millstone."

The drainage is good, and only defective when rendered so by the owners of property. We have no system of sewerage, and out-houses are miserably cared for—in most cases, not at all. A thickly inhabited part of the town suffers from the drainage of the rest towards it.

I am quite sure that some of the wells have been injured by the location of cesspools, either being too near, or else in the direction of the dip of the rock. We depend upon wells and cisterns. Our water has never been tested, but should be.

Heating is by furnaces and stoves; many of the furnaces are miserably constructed, and generate more gas than heat. Cellars and basements are cleansed and aired to a limited extent; nothing to what is desirable.

I think every town, or township, should have a Board of Health, but I very much doubt if our people are sufficiently educated in regard to the matter to make it feasible."

Animals are not allowed to be slaughtered within the borough from May to October, but the accumulations of the winter often remains late in the season, emitting a most offensive odor.

Our report from Salem county speaks of malaria as the first and most active local cause of disease. All our diseases assume this type to a greater or less degree. There is defect of drainage in some parts; although there is a Board of Health in the chief city, its powers are limited. There is no system of vital statistics and no certificates as to the cause of death.

Soon after the appointment of this commission, we were called upon to mourn the death of Dr. R. M. Cooper, of Camden. During twenty years past he had been a devoted student of sanitary science.

To his wise counsel and advice Camden and its vicinity owe many sanitary improvements, and he was ever busy urging other needed reforms upon the attention of corporate authorities. The supervisory work of the commission, which would have fallen to his lot, has been ably attended to by Dr. H. Genet Taylor, of Camden, and herewith are appended abstracts from reports received through him.

The first is the report as to Camden city.

The prevailing diseases of Camden city are principally of miasmatic origin, but not to such an extent as in former years.

The city proper has been vastly improved in health by a judicious system of drainage and culverting, particularly throughout the main streets, but the increasing population, now numbering nearly 30,000, and the large area of ground which is being built upon, has retarded their introduction to the extent that would be desirable.

The immediate site of Camden city is very level, with but little rising ground, except in a southwesterly direction, and therefore admits of but few natural advantages for proper drainage, and the



unimproved river front, particularly in the southern part of the city, where extensive marshes exist, gives rise to a prolific source for malarial diseases of a typhoid nature.

The system of culverting is open to many objections. In not carrying the outlets sufficiently into the river, and in some cases the culverts are not of the proper grade to allow the free passage of its contents, while others were constructed with gas and water pipes running through the central portion, which has been a cause of leakage, and, during heavy rains, caused them to give way. But, as far as practicable, these defects, in the old culverts, have been gradually removed, and those now constructed are larger and better adapted for their purpose.

The garbage is collected daily, by special ordinance of city council; persons are liable to penalties if found emptying it into the streets, but we frequently meet with violations of the same, but as the collections of the refuse of the kitchen by the city was only established this past year, it is very generally complied with.

The house water-closets are connected by iron waste pipes with the drain leading to the culvert and supply of water from the pipes of bath-rooms. In many cases the supply of water is insufficient to wash them thoroughly, and if not properly cared for by using disinfectants, etc., they become foul and unfit for use.

Our water supply is from the river Delaware. The works are situated two and a half miles from Camden. I enclose you the report of the Chief Engineer, which embraces very fully its condition and the mode of supply. We depend upon it almost altogether for drinking purposes, and have had no sickness this summer that could be directly attributed to its use. The improvement this year in its purity can be accounted for by the proper cleansing of the reservoir, and carrying the pipe, through which the water is taken from the river, farther out into the stream; also the laying of a thirty inch main from the works to the city, which gives us an increased volume of water, and by opening the fire plugs weekly, particularly at the extreme sections of the city, carries off any impurities that otherwise would lodge in the pipes.

The method of heating houses is generally hot air furnaces, coal and wood stoves, and in a few instances, steam pipes have been introduced in some of the larger dwellings. The public buildings are usually supplied with furnace heat, and ventilated by registers in the flues near the ceiling.

The public schools by same method, with exception of ventilation, and recently the Board of Education have adopted what is known as "Barker's System," which I believe is a double valve register. Through the lower one passes the hot air into the room and into the upper, the air from the room passes out into the flue, keeping a constant current, and when examined by the Board, was



taken in preference to many others submitted. The intention is to have it applied to all the public schools as soon as practicable.

The air space for each scholar in the large school-houses is about eighty-five to ninety cubic feet, averaging from fifty to sixty inmates to a room. A thermometer is kept in each room to regulate the temperature. The factories, I have not ascertained the air space, but think in the larger mills it must be below that average.

Cellars and basements are cleansed and whitewashed, but not sufficiently aired. The mode of building houses at the present time, with very small cellar windows, is entirely insufficient, even if opened daily, to properly ventilate them, and when neglected, causing considerable dampness throughout the lower stories of the buildings.

Vaccination, since the epidemic of 1872, has been neglected by many families. We have no regularly appointed physician for that purpose, and hence have no systematic arrangement. A temporary physician was appointed during the late epidemic, but only those that applied received the benefit of it.

The Board of Health of Camden is simply the appointment of five members of the city councils, called the Sanitary Committee, and have power to correct and abate all nuisances. It is ably represented by the chairman, Mr. Bourquin.

The defects of the Board are, as he says: "Members are not liable for the non-performance of their duties, etc., and another, in my opinion, is that a part of the Board should be composed of medical men. The Camden City Medical Society have a sanitary committee appointed yearly, but they can only advise or make suggestions to the Sanitary Committee of the City Councils, but have no power to control or enforce any measures they might deem necessary."

The city is not provided with a hospital, but one on a small scale even, would be ample for a few years. We have a dispensary, which has been of great benefit to the poor since its organization, eight years ago. It was originally fitted up with temporary beds in cases of serious accident, but had to be abandoned for lack of funds, and is now supported by contributions of citizens, and an annual donation of \$300 by the City Councils.

The only factory or manufacturing institution that has been noticed as injurious to the health of its employees, or the neighborhood, is the large chemical works, situated just inside of the city limits, on Cooper's Creek. Here they manufacture sulphuric acid, nitric acid, etc. It is now undergoing extensive alteration and improvements in order to condense or carry off any excess of noxious gases. The Board of Health indicted the proprietors, but the Grand Jury, in consequence of a favorable report made by the Medical Sani-

tary Committee on the alterations and improvements, allowed it to continue in operation, but liable to future action if objectionable.

The slaughtering of animals is seldom carried on in the city limits, and all slaughter-houses, pig-pens, etc., have been removed outside of the city. In the vicinity where it is conducted, they are very objectionable, care not being taken to remove the offal. Sometimes it is thrown into a vat or a pit, and the place seldom disinfected, as it is outside of the city limits, the Board of Health have no jurisdiction, and the Township Committee who have control, seldom attend to the abatement of anything detrimental to health, unless ordered to by legal proceedings.

Our system of vital statistics consists of registration of all births, but is not carried out with regularity.

The statistics received at the City Clerk's office, are not reliable. Death requires certificates of physicians before interment, and consequently in all cases prevents any crimes or suspicious circumstances attending the deceased from concealment. This applies only to the city limits; in the adjacent townships, I believe none is required.

Disinfection, when used by the Board of Health throughout the city, is principally chloride of lime, sprinkled in the gutters and inlets, after being cleansed. Sulphate of iron sometimes has been extensively used in private dwellings for water closets, drains, sinks, etc.

The garbage collections in the city are taken outside of the city limits, and left exposed in some open field until some other provision is made for utilizing it.

There are many suggestions of modes by which sanitary improvements could be made, and legislative action, I believe, alone, will effectually bring the needed reform.

The Delaware river from a cove being far from the main channel and shoal, contains much organic and vegetable matter, as well as being near Cooper's creek, which is rapidly filling up with factories.

The gas from some of the factories in the vicinity of Camden is spoken of as not only a nuisance, but as deleterious to the public health.

Slaughter-houses are still maintained within city limits, although recognized as great nuisances.

Both in Camden and Burlington county, in parts, a typhoid tendency in disease is marked. A scientific system of surface and culvert drainage to carry contents beyond the flats, which are along the shore of the river and creeks, is greatly needed.

Also the filling up of marshy lands and ponds within our city limits and its neighborhood. A thorough ventilation in our public buildings, churches, schools, (some should now be removed), as well as private dwellings, would insure a greater degree of health and comfort.

Reports from Gloucester county say: Enteric or typhoid fever and pneumonia are prevalent here. The removal of growing timber is felt to be a cause of disease, and in the last two years there has been some miasmatic disease.

Out houses are spoken of as not properly cared for. The modes of heating and ventilating public buildings is often defective. In some cases water is found contaminated with lead.

Paper makers and operators on sewing machines are recognized as injured by their occupation.

There is no system of vital statistics, and no records as to cause of death. Public information on sanitary matters is much needed.

In another report out houses are spoken of as "very badly cared for." "In some instances they are cleaned annually."

In schools, about one hundred and ten feet of cubic air (instead of four hundred) is the average for pupils.

"Vaccination in most instances is only prevalent when small-pox threatens to invade.

Operatives at the glass factories, who work in the dust arising from insoluble substances, clay, lime, etc., die sooner or later of consumption.

Facts as to the unsanitary condition of Jersey City, Hudson, and Hoboken, are such that one of the most distinguished physicians of that vicinity speaks of the locality as filth-ridden, and most of its sanitarians are aware of manifold nuisances which they are well nigh powerless to abate.

It would extend this report too far to treat of them in detail. They are just such as New York or any other large city must have, unless there is some decided sanitary authority. Newark is, in some respects, better sanitary condition than any large city of our State, and while prompt and intelligent work has there been done by the chief medical protector of its public health, he in common with other sanitarians, finds large existing causes of mortality and ill health, which might, without oppressive measures, be abated by more permanent health boards and by a more intelligent appreciation of the vast interests involved.

The reports from various medical societies in this State for 1874, as abbreviated by Dr. S. Wickes, of Orange, have just come to hand as we are closing this report, and they give fresh and recent illustrations of all that has been said heretofore.

In one of the towns of Camden county, "dysentery assumed a malignant form, while in the other villages there was almost entire immunity." In Cape May county, increase of remittent fever is reported. Cumberland county reports scarlet fever, erysipelas and rheumatism as prevalent; diseases well known to depend, for their frequency or fatality, much on abatable causes. In Gloucester county a "general tendency to intermittents" is noticed. Hudson county "has been visited, during the autumn, by malarial diseases,

in the form of intermittent, remittent and typho-malarial fevers; and other diseases, such as diphtheria, puerperal fever and erysipelas, prevailed to an extent which points to local exciting causes." In Mercer county the Normal and Model Schools were closed on account of scarlet fever. Frequent cases of lead poisoning occur among workers in pottery ware. "It is pitiful to see children of tender years suffering the agony of lead colic," Pulmonary disease is very common among these operations, because of the dust inhaled. Trenton is said to rival in its death-rate the most unhealthy cities, and its drainage and sewerage are reported as most defective. At least five more counties are reported as suffering from diseases to no small degree, dependent upon miasmatic or other local causes.

Says one reporter, speaking of his cases of typhoid fever: "All of them were caused by either defective water-closets in houses, or by want of cleanliness in reference to drains, privies or cellars. \* \* To my personal knowledge many an elegant villa and beautiful country residence is so constructed that the stench from the pipes, leading to the above mentioned receptacles, is such that the servants can scarcely endure to use the stationary wash-tubs, and the opening of the lids of the slop hopper in the second story fills the room with an abomination of putrescence. The servants have intermittents; madam has neuralgia, dyspepsia, and a host of other ailments; the children have gastric fever and diphtheria; and they all wonder why country air don't agree with them. They go to the seaside in the summer, and to the city during the inclement winter months; the house is shut up, and a man servant is left to take care of it, who sleeps in the hall-bedroom at night and has typhoid fever.

We have not, in this report, deemed it necessary to give details as to all parts of the State, but rather, by a few reliable statements from some of the most skilled and intelligent sanitary observers in the State, to indicate the need which exists of making this a subject of profound legislative attention.

While so many of the States are recognizing this as a matter for their most careful study, our own central and exposed position requires immediate attention to these great and material interests.

It now only remains for us briefly to indicate what is feasible to be done by the State in order to secure the greater protection of its citizens from disease. The first need is the presentation of actual facts as to our hygienic condition.

To this end our vital statistics need to be compiled on an entirely different system. For instance, we need to know the number of deaths in special localities, and the causes of death, in order to be directed to the operating causes which produce excessive death-rate at certain points.

There is also need that the facts which are gathered by health officers in each city, and in each portion of the county, be studied, compared, and so elaborated and arranged as that they shall more



fully instruct us as to the causes and methods of prevention to be adopted at the time.

Then the spreading of information among the people, as to those matters which concern health, is of the greatest importance. We can not trust for this to a profession whose special business is the treatment, rather than the prevention of disease.

Nor can we trust to the general diffusion of information, any more than we can trust education, or the development of the hidden resources of the State, entirely to private enterprise. We wisely look after the educational interests of the State; we appoint a geologist to look into its mineral wealth; we necessarily have boards to look after our asylums and other institutions which the State cannot leave to the laws of general provision. So we need to look after the fundamental matter of public health, and to diffuse such information among the people as shall abate many of the sources of degeneration. The economy of prevention far exceeds that which can be applied in attempts to limit expense after the evil is on our hands. In common with many others who have given this subject studious examination, we feel sure that this is a work to be done for and in this State, which can contribute largely to the welfare of its citizens. We believe, that in some simple and inexpensive form, there should be a central council or board of men, chosen, not from any one profession or sphere of life, but of those who are intelligent upon sanitary matters, and alive to the great interests which the State has in this matter. Under their charge should be placed the whole subject of vital statistics. While they need to have no jurisdiction over corporate authorities, yet they would be of great service in collecting and arranging the materials provided by local authorities, and also, in an advisory way, indicating the methods by which the greatest advance could be made in general sanitation.

In some cases the enactment of more stringent laws is required, in order to protect citizens from nuisance and sources of disease, and it would be the province of such a council, from time to time, to suggest to the Legislature what, in their opinion, needed to be done to protect the lives and health of the citizens. Laws need not generally, on such matters, be much in advance of popular sentiment, but the effect of reasonable law, and at the same time of the spreading of definite facts before the people, is generally to create a popular interest in those measures which secure the greater health of the citizen. In examining into the few health laws of our State, and in conferring with prominent city health officers, we find that there are defects and embarrassments which need correction, and which, under the suggestion and examination of some central board, would secure such attention as would lead to effective legislation.



The experience of other States has shown the wisdom of such provisions.

By careful and authentic facts as to prevention of disease, the people are enlightened as to the evils arising from public and private neglect of the laws of health.

Such legislation is also secured as not only remedies nuisances when they exist, but by the admonitions of salutary law prevents their occurrence. It is not only proposed to confer upon such council powers such as often necessarily belong to city boards, amid the emergencies of epidemics, but rather to make them the medium through which facts can be collected and tabulated.

It will afterward be the sphere of wise legislation to judge how far general and special evils are to be abated by law, and how far they are to be reached by the diffusion of specific information to those whose health and welfare are concerned. The whole subject is one that can no longer escape the attention of the statesman and the citizen. It is only by looking after the sanitary interests of the whole state that the interest of each portion can be secured. The amount now expended for vital statistics will thus be turned to some valuable purpose, and the welfare of our citizens be promoted to a degree which mere pecuniary computation cannot estimate. We thus commend this great public and national interest of the public health, and the prevention and limitation of disease, to the consideration of your Excellency and of the Legislature—because exemption from unnecessary exposure to disease is among the dearest rights of the citizen, and one of the noblest objects to which the attention of his representatives can be turned.

(Signed)

JAMES R. MERCEIN, Jersey City,  
SAMUEL LILLY, Lambertville,  
GEORGE H. COOK, New Brunswick,  
WILLIAM ELMER, JR., Trenton,  
LEWIS W. OAKLEY, Elizabeth,  
*Chairman*, EZRA M. HUNT, Metuchen.

Hereto is appended a form of law similar to that of Massachusetts and Michigan, which your Commission suggests as desirable in this State.

AN ACT TO ESTABLISH  
A STATE BOARD OF HEALTH.

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1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That the Governor shall appoint seven persons, who shall constitute the Board of Health and Vital Statistics. The persons so appointed shall hold their offices for seven years; provided that the terms of office of the seven first appointed shall be so arranged that the term of one shall expire each year, and the vacancies so created, as well as all vacancies occurring otherwise, shall be filled by the Governor. The Secretary of State and the Attorney General shall be ex-officio members of the Board.

2. The Board shall take cognizance of the interests of health and life among the citizens of this State. They shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics and the sources of mortality, and the effects of localities, employments, conditions, and circumstances on the public health; and they shall gather such information in respect to these matters as they may deem proper for diffusion among the people. They shall also make inquiries and reports in reference to diseases affecting animals, and the methods of prevention. They shall convene on the call of any two members, and appoint a chairman, who shall call meetings as often as every three months, or when requested to do so by two members of the Board. They shall, in the month of December, make report to the Governor of their investigations and opinions during the year ending December 1st, with such suggestions, as to legislative action, as they may deem necessary.

3. The Board shall elect a Secretary who shall also be the Register of Vital Statistics, and a member of the Board. He shall perform and superintend the work prescribed in the law, and such other duties as the Board may require. No member, except the Secretary, shall receive any compensation: but the actual personal expenses of any member while engaged in the duties of the Board, shall, upon approval by the Governor, be paid. The pay of the Secretary and Register of Vital Statistics shall be ——— dollars per annum.

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## ERRATA.

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Page 1, line 7—For “preventure” read “prevention.

Page 1, next to last line—For “was” read “is.”

Page 7—For “district” read “distinct.”

Page 9, line 4—For “time” read “true

Page 25, line 3—Read “anomalies.”







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